

Municipal Journal

Volume XXXII.

NEW YORK, FEBRUARY 29, 1912.

No. 9

ELECTRIC STREET LIGHTING

Selection of Style of Lamp Adapted to Individual Cases—Height Above Street Surface—Effect of Reflectors and Globes—Calculation of Annual Costs of Lamps Under Various Conditions

THE engineering experiment station of the University of Illinois has issued a bulletin on street lighting which was prepared by J. M. Bryant, assistant professor of electrical engineering, and H. G. Hake, instructor in electrical engineering. This book goes quite fully into the general subject of electric street lighting, describing the theory and construction of incandescent and arc lamps; the series and multiple systems of distribution; the principles of photometry and illumination, including the measurement of illumination; effect of shades and reflectors, with tables and curves for the calculation of illumination. A chapter is given on lighting of business streets, cross streets and boulevards, residence streets and outlying districts, and methods and unit costs are given for calculating approximate cost of operation of different lamps. "An attempt has been made to present this information in such a form as to be readily understood by the general public without requiring any special technical knowledge." The bulletin is also "designed to be of assistance to central station superintendents, and to the general public in selecting the proper lamp and fixing the charge for the same." The bulletin contains 60 pages of text and illustrations. Some of the subjects discussed are so practical and of such general application that we are producing an abstract of portions of them below, with the suggestion that those interested in a complete discussion of street lighting should obtain a copy of the bulletin, if possible.

The distribution curves of lamps may be greatly altered by the use of reflectors and globes. Each of these reduces the total efficiency of the lamp, but may increase the candle power in a desired direction. Thus a white porcelain enameled reflector above a lamp may increase the mean candle power distributed below the horizontal by 5 per cent., although the mean spherical candle power is decreased by 24 per cent. Opal globes tend to make the distribution curve more uniform and lower the intrinsic brilliancy, both of which are advantages; but they absorb 10 and in some cases 25 or even a greater per cent. of the light.

In deciding upon the kind and distribution of lamps it should be borne in mind that business streets require a different treatment from residence streets, and that parks and open places require a still different arrangement of lights.

It is suggested that the city streets and areas be divided into four classes:

- A. Principal business streets;
- B. Important cross streets and boulevards;
- C. Residence streets;
- D. Outlying districts.

In the principal business streets the illumination should be more or less brilliant, as uniform as possible, and of sufficient intensity to enable one to read ordinary size print. For these streets inclined carbon flame arcs are used in Europe, but have not met with favor in this country on account of the high operating cost. The long burning flame arc, however, is not open to this objection. There is now a strong tendency toward clusters of tungsten lights or arc lights on ornamental poles, placed low on both sides of the street.

Cross streets and boulevards require a much less brilliant illumination. The principal cross streets do not usually have shade trees, and may be lighted either by high intensity lamps suspended high, or low intensity lamps more closely spaced and suspended low. Boulevards are usually shaded and require the lights to be suspended low unless the streets are very wide. For shaded streets, lights upon ornamental poles at the sides of the street are preferable to those suspended over the center, since such a street is used mostly for light vehicles, moving more or less rapidly, and the lights should not be hung so as to blind the drivers.

Residence streets should have as a minimum one light at each street crossing for the safety of vehicles and pedestrians approaching these crossings, as collisions are more likely to occur at such points. These streets are usually rather narrow and densely shaded, thus requiring the lights to be suspended not over 15 to 25 feet above the street surface. The general average of the illumination should be low. The character and color of the street surface has a marked effect upon the illumination; thus a macadamized road or asphalt pavement needs much more illumination than one paved with light bricks. If the lights are 25 feet or less above the street and the blocks are 400 feet or more in length, corner lights will not give sufficient illumination in the middle of the block. Also, in crooked streets or where the surface is uneven or hilly, lights must be spaced more

closely than at every street crossing. The illumination in the immediate neighborhood of most arc lights is higher than is necessary for this class of street; consequently residence street lighting is the particular field for the incandescent light. In choosing a light for this class of service the economic limit comes in the ordinary spacing of poles on the street, and the lowest value of illumination allowable immediately below the light."

"In the outlying districts either the tungsten light or an arc light having low operating cost may be used. It is seldom that a community can afford to have an arc light at each street intersection in such a district. Hence for protection and safety the tungsten light may be used to good

advantage." Streets connecting trade centers may be treated as boulevards or as residence streets, according to the traffic conditions.

In selecting lights for the several classes of streets the central station furnishing the power must also be considered. In any system the station apparatus should be interchangeable from one circuit to another for continuity of service and low first cost and maintenance. Thus, if D. C. lamps are chosen, they should all have the same current consumption, and this should also fit well with incandescent lamps on the market. On the other hand, small compensators may be supplied with each A. C. lamp to adapt it to any A. C. circuit.

COST AND OPERATING CHARACTERISTICS OF ARC LAMPS.

ITEMS.

	Open Arc D. C. Carbon.	Twin Arc. D. C.	Enclosed Arc. D. C.	Enclosed Arc. A. C.	Magnetic Arc. D. C.	Magnetic Arc. D. C.	Flame Arc. D. C. Inclined Carbon.	Flame Arc. A. C. Carbon.	Flame Arc. D. C. Vertical Carbon.	Flame Arc. A. C. Vertical Carbon.	Flame Arc. D. C. Long Burning.	Flame Arc. A. C. Vertical Carbon.
1 Voltage across lamp terminals.....	50	72	72	72	80	80	55	55	70	70	5.5	5.5
2 Current ampere	9.6	6.6	7.5	6.6	6.6	4.0	10	10	5.5	5.5	355	355
3 Terminal watts	480	475	480	425	528	320	550	467	385	2,575	1,925	85*
4 Maximum candle power value.....	1,250	525	350	275	1,600	730	2,400	....	70°	70°	1,485	1,485
5 Maximum candle power angle with vertical.....	45°	65°	40°	40°	80°	80°	0°-30°	....	....	....	....	....
6 Mean lower hemispherical candle power (H. S. C. P.)	800	468	298	244	1,170	457	1,785	850	1,800	1,800	1,800	1,800
7 Watts per H. S. C. P. ....	.6	1.01	1.61	1.71	.45	.70	.81	.55	.28	.28	.28	.28
8 Kind of glassware, inner globe.....	None	Opal	Opal	None	None	None	None	None	Clear	Clear	Clear	Clear
9 Kind of glassware, outer globe.....	Clear	Clear	Clear	Clear	Clear	Clear	5 D	....	Opal	Opal	Opal	Opal
10 Curve sheet, figure.....	3 A	4 C	4 B	4 A	3 B	3 C	....	....	5 C	....	....	....
11 Life positive electrode, hours.....	17	125	110	110	1,500	4,000	17	17	70	100	100	100
12 Life negative electrode, hours.....	17	125	100	110	100	175	17	17	70	100	100	100
13 Life inner globe	400	400	400	400	....	....	....	....	300	300	300	300
14 Life outer globe	1,000	2,000	2,000	2,000	2,000	2,000	1,000	1,000	2,000	2,000	2,000	2,000
15 Cost of lamp, dollars.....	15.00	34.50	20.00	20.00	40.00	40.00	60.00	60.00	60.00	60.00	60.00	60.00
16 Cost of positive electrodes, dollars per trim.....	.015	.021	....	....	.50	.45	.14	.14	.25	.25	.25	.25
17 Cost of negative electrodes, dollars per trim.....	.015	.021	.022	.022	.06	.05	.14	.14	.25	.25	.25	.25
18 Cost of inner globe, dollars each.....	....	.15	.15	.15	....	....	....	....	.50	.50	.50	.50
19 Cost of outer globe, dollars each.....	.50	.50	.50	.50	1.00	1.00	1.00	1.00	.75	.75	.75	.75
20 Cost of labor in trimming, etc., per trim.....	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06
A—Fixed Charges, Annual.....												
21 Interest on investment at 6 per cent.....	.90	2.07	1.20	1.20	2.40	2.40	3.60	3.60	3.60	3.60	3.60	3.60
22 Depreciation at 10 per cent.....	1.50	3.45..	2.00	2.00	4.00	4.00	6.00	6.00	6.00	6.00	6.00	6.00
23 Total annual fixed charge.....	2.40	5.52	3.20	3.20	6.40	6.40	9.60	9.60	9.60	9.60	9.60	9.60
B—Maintenance Charges per 1,000 Hours.....												
24 Cost of electrodes, dollars.....	.89	.17	.22	.20	.93	.40	8.28	8.28	3.56	3.56	2.50	2.50
25 Cost of inner globes, dollars.....	....	.37	.37	.37	....	....	....	....	1.67	1.67	....	....
26 Cost of outer globes, dollars.....	.50	.95	.25	.25	.50	.50	1.00	1.00	.37	.37	....	....
27 Cost of trimming and inspection, dollars.....	3.54	.48	.60	.55	.60	.84	8.54	8.54	.85	.85	....	....
28 Cost of rectifier renewals, dollars.....	....	.50	....	....	.50	.50	.50	.50	....	....	....	....
29 Cost of repairs, dollars.....	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50	.50
30 Cost of maintenance, total, dollars.....	5.43	2.27	1.94	1.87	8.03	2.24	13.77	13.27	7.45	7.45	5.64	5.64
C—Cost of Energy per 1,000 Hours.....												
31 At one cent per kilowatt hour.....	4.80	5.42	4.80	4.25	6.05	3.65	6.26	4.67	4.40	3.50	3.50	3.50

*Line 31 has been computed from line 3, considering the rectifier efficiency.

COST AND OPERATING CHARACTERISTICS OF TUNGSTEN LAMPS.

ITEMS.

	For Suspension in Place of Arc.				For Suspension at Side of Street.			
1 Candle power horizontal.....	32	60	100	200	350	32	60	100
2 Terminal watts	38	71	118	236	413	38	71	118
3 Watts per mean horizontal candle power.....	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
4 Mean hemispherical candle power (with reflector).....	43	80	135	227	471	43	80	135
5 Watts per H. S. C. P.	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
6 Maximum candle power, value.....	.45	.84	.140	.280	.490	.45	.84	.280
Maximum candle power, angle with vertical.....	70°	70°	70°	70°	70°	70°	70°	70°
7 Curve sheet, figure.....	....	....	....	....	....	....	....	....
8 Life of lamp, hours.....	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350
9 Cost of lamp, dollars.....	1.00	1.00	1.20	2.44	3.75	1.00	1.00	2.44
10 Cost of labor for inspection and cleaning, annual.....	.40	.40	.40	.40	.40	.40	.40	.40
11 Cost of fixtures, dollars.....	1.50	1.50	2.00	2.50	5.00	5.00	5.00	5.00
12 Cost of lamp and fixtures.....	2.50	2.50	3.20	4.94	6.25	6.00	6.20	7.44
A—Fixed Charges, Annual.....								
13 Interest on investment at 6 per cent.....	.15	.15	.17	.30	.37	.36	.37	.45
14 Depreciation at 10 per cent.....	.25	.35	.32	.49	.63	.60	.62	.74
15 Annual inspection charge.....	.40	.40	.40	.40	.40	.40	.40	.40
16 Total annual fixed charges.....	.80	.80	.89	1.19	1.40	1.36	1.39	1.59
B—Maintenance Charges per 1,000 Hours.....								
17 Cost of lamp renewals, dollars.....	.74	.74	.83	1.80	.74	.74	.83	1.80
18 Cost of repairs .....	.05	.05	.05	.10	.10	.15	.15	.15
19 Cost of maintenance total.....	.79	.79	.88	1.90	2.90	.89	.89	1.95
C—Cost of Energy per 1,000 Hours.....								
20 At one cent per kilowatt hour.....	.88	.71	1.18	2.36	4.13	.88	.71	1.18

Illustration of use of table.—Assume a 6.6 ampere alternating current, enclosed arc lamp to be operating on a 4,000 hour schedule, the energy costs being three cents per kw.h. What will be the cost of operating this lamp for one year?

From the table, for 1,000 hours and one cent per kw. h.:

Annual fixed charges.....	\$3.20
Maintenance per 1,000 hours.....	2.30
Energy per 1,000 hours at one cent.....	4.25
For 4,000 hours at three cents per kw. h.:	
Annual fixed charges.....	\$3.20
Maintenance charges for 4,000 hours = 4 x \$2.30.....	9.20
Energy for 4,000 hours at 3 cents = 4 x 3 x \$4.25.....	51.00
Total charge per lamp per year.....	\$63.40

HORIZONTAL DISTRIBUTION AT STREET SURFACE FOR DIFFERENT HEIGHTS AND SPACINGS.
6.6 Ampere D. C. Enclosed Arc.

Spac- ing feet.	h feet.	Distance—feet.								
		0.	50.	100.	150.	200.	250.	300.	350.	400.
800	25	.36	.075	.011	.0034	.0014	.0007	.0004	.0004	.0004
400	25	.36	.075	.011	.04	.003	.004	.011	.075	.36
200	25	.372	.082	.023	.082	.372	.082	.023	.082	.372
800	40	.14	.079	.0168	.0054	.0022	.0012	.0007	.0006	.0006
400	40	.14	.08	.017	.0066	.0044	.0066	.017	.08	.14
200	40	.142	.085	.034	.085	.142	.085	.034	.085	.142
		6.6 Ampere D. C. Magnetite.								
800	25	.80	.225	.034	.0111	.0046	.0024	.0013	.001	.001
400	25	.80	.226	.035	.0135	.0092	.0135	.035	.226	.80
200	25	.85	.238	.069	.238	.85	.238	.069	.235	.85
800	40	.315	.205	.047	.0163	.0073	.0039	.0022	.002	.0016
400	40	.316	.206	.049	.020	.014	.020	.049	.206	.316
200	40	.329	.225	.096	.225	.329	.225	.096	.225	.329
		6.6 Ampere A. C. Enclosed.								
800	25	.28	.032	.0044	.0016	.0014	.0016	.0044	.032	.28
400	25	.28	.032	.0044	.0016	.0014	.0016	.0044	.032	.28
200	25	.28	.035	.009	.035	.28	.035	.009	.035	.28
800	40	.11	.042	.008	.0024	.0011	.0005	.0003	...	...
400	40	.11	.042	.008	.003	.0022	.003	.008	.042	.11
200	40	.11	.045	.016	.045	.11	.045	.016	.045	.11
		350 C. P. Tungsten.								
800	25	.37	.063	.0095	.008	.0012	.0006	.0004	.0002	.0002
400	25	.37	.032	.01	.004	.0024	.004	.01	.032	.37
200	25	.37	.038	.025	.038	.37	.038	.025	.038	.37

ANNUAL COST OF LIGHTING ONE MILE OF STREET SO AS TO GIVE A MINIMUM HORIZONTAL ILLUMINATION OF .02 FOOT-CANDLE.

Height, 25 ft. for arcs, and 350 C. P. Tungstens; 20 ft. for all others.

Kind of Lamp.	Distance Apart.	Lights per Pole.	Cost for						
			Foot-Candle.	4,000 Hours.	2,500 Hours.	Max.	Min.	1 Lamp.	Total.
Enclosed D. C. 6.6 ampere	200	1	.372	.023	\$79.80	\$2,150	\$51.89	\$1,400	
Enclosed A. C. 7.5 ampere	200	2	.68	.024	68.56	3,640	44.05	2,380	
Enclosed A. C. 6.6 ampere	200	2	.56	.02	61.68	3,300	39.73	2,166	
Magnetite D. C. 6.6 ampere	400	2	1.8	.018	91.12	2,550	59.27	1,660	
Magnetite D. C. 4.0 ampere	200	1	.564	.033	59.16	1,595	39.40	1,065	
Flame D. C. 10.0 ampere inclined	400	2	7.62	.016	140.28	4,000	91.12	2,550	
Flame D. C. 5.6 ampere long burning	400	2	2.52	.024	92.20	2,580	61.22	1,714	
Tungsten 350 C. P. center suspension	200	1	.365	.023	37.11	1,000	23.64	638	
Tungsten 350 C. P. center suspension	200	1	.37	.025	62.56	1,690	39.61	1,070	
Tungsten 32 C. P. side suspension	100	2	.12	.02	9.48	1,006	6.43	682	
Tungsten 60 C. P. side suspension	190	1	.11	.021	13.44	713	8.89	477	
Tungsten 100 C. P. side suspension	100	1	.183	.034	19.47	1,032	12.69	673	
Tungsten 200 C. P. side suspension	200	1	.365	.023	37.71	1,020	24.16	652	
Tungsten 350 C. P. side suspension	200	1	.6	.02	63.15	1,700	40.12	1,080	

The items which enter into the cost of lighting are the fixed charges, maintenance charges and energy charge. It is considered that 6 per cent. would be a fair allowance for interest on capital invested, taxes, insurance, etc., and that 10 per cent. would provide for depreciation, although the latter would need to be increased 18 per cent. in the case of a private company with a franchise or contract for only five years, since the city may require an entire change of its system at the end of that period, or award the contract to another company.

Maintenance charges include cost of renewals due to consumption of electrodes, breakage of glass ware and repairs to the mechanism of the lamp; a charge for labor in trimming, cleaning of glass ware and reflectors, inspection, store room charges, etc. Figures are given in the bulletin based on the assumption of an average installation, of, say, 400 arc lamps or their equivalent in incandescent lamps, and a table giving these figures is presented herewith. In making the estimates the trimming cost for tungsten lamps is figured low on account of the long life of these units. The reflectors of these lamps are assumed to be thoroughly inspected and cleaned each time the lamps are renewed, and also at regular intervals, say, four times a year. The arc lamps are supposed to be cleaned and inspected by the trimmer.

Energy charge covers the cost of delivering the power

at the lamp terminals, and includes depreciation on station apparatus, poles, wires, etc., and the maintenance charges on the same. The cost of the rectifier outfit is included in the cost of the D. C. lamps, and its depreciation charge is placed there also. There are many factors which affect the cost of energy in different cities. Some of these are the following:

Cost of coal delivered at the power plant;

Available water power or natural gas;

Cost of the land on which the plant is located and taxes on the same;

Amount of power developed and the load factor;

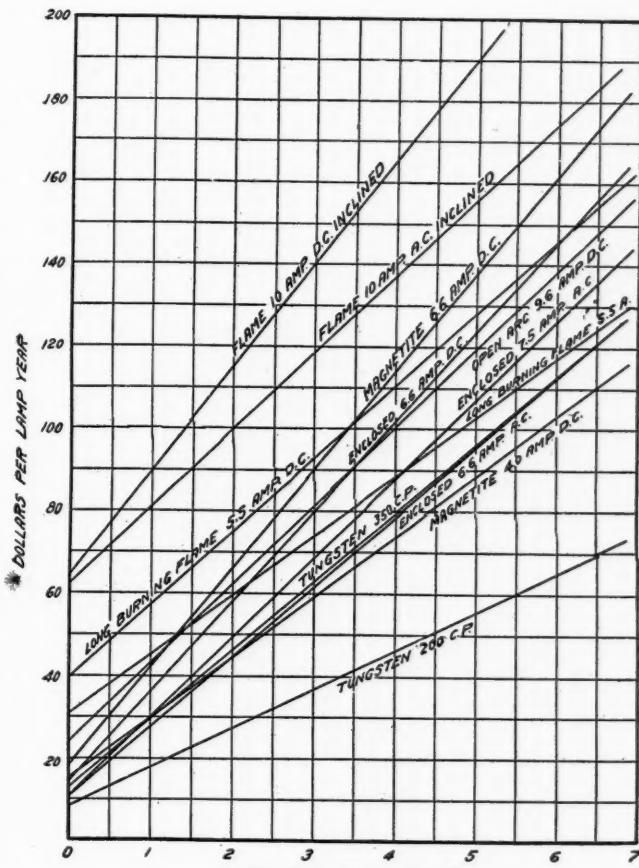
Available market for steam heat;

Cost of delivering the power to the consumer (varying with type of construction, whether pole lines or conduits, and the taxes or rentals on the same);

Interest and depreciation on the equipment.

These items vary so widely in different localities that the writers did not attempt to make any definite statements.

The cost per year, of course, varies with the number of hours the lamps are used. Most cities of 20,000 population or over burn the lamps "all night and every night," or about 4,000 hours per year. In smaller cities and suburban districts various "moonlight schedules" are in use, the average of these being about 2,500 hours per year. In small cities, where only a few circuits are necessary and where a duplicate set of station equipment cannot be afforded, the "all night and every night" schedule may be approximated by allowing four nights each month near full moon, when the lights on certain circuits may be turned off, allowing the necessary repairs to be made. Inclined carbon flame arcs can be used successfully only for very bright illumination on account of the intensity at the zero angle. For dim, uniform illumination the tungsten light is the proper one to choose on account of the lower intensity available in the small units and its excellent distribution curve for this purpose.



CURVES SHOWING ANNUAL OPERATING COST OF ARC LAMPS ON 4,000 HOUR SCHEDULE.

A lamp throwing a strong light at a wide angle must be surrounded by an opal globe in order to lower its intrinsic brilliancy. The lower the light is hung over the center of the street, the more important this is. For very bright lights like the flame arcs this must also be observed, even when the lights are hung high, as they are still in the line of vision and effective at a greater distance.

GERMAN SEWAGE PURIFICATION WORKS

At Holzwiede, a Town of 3,500 Population—Preliminary and Final Sedimentation and Percolating Filter—Conclusions Regarding Purification.

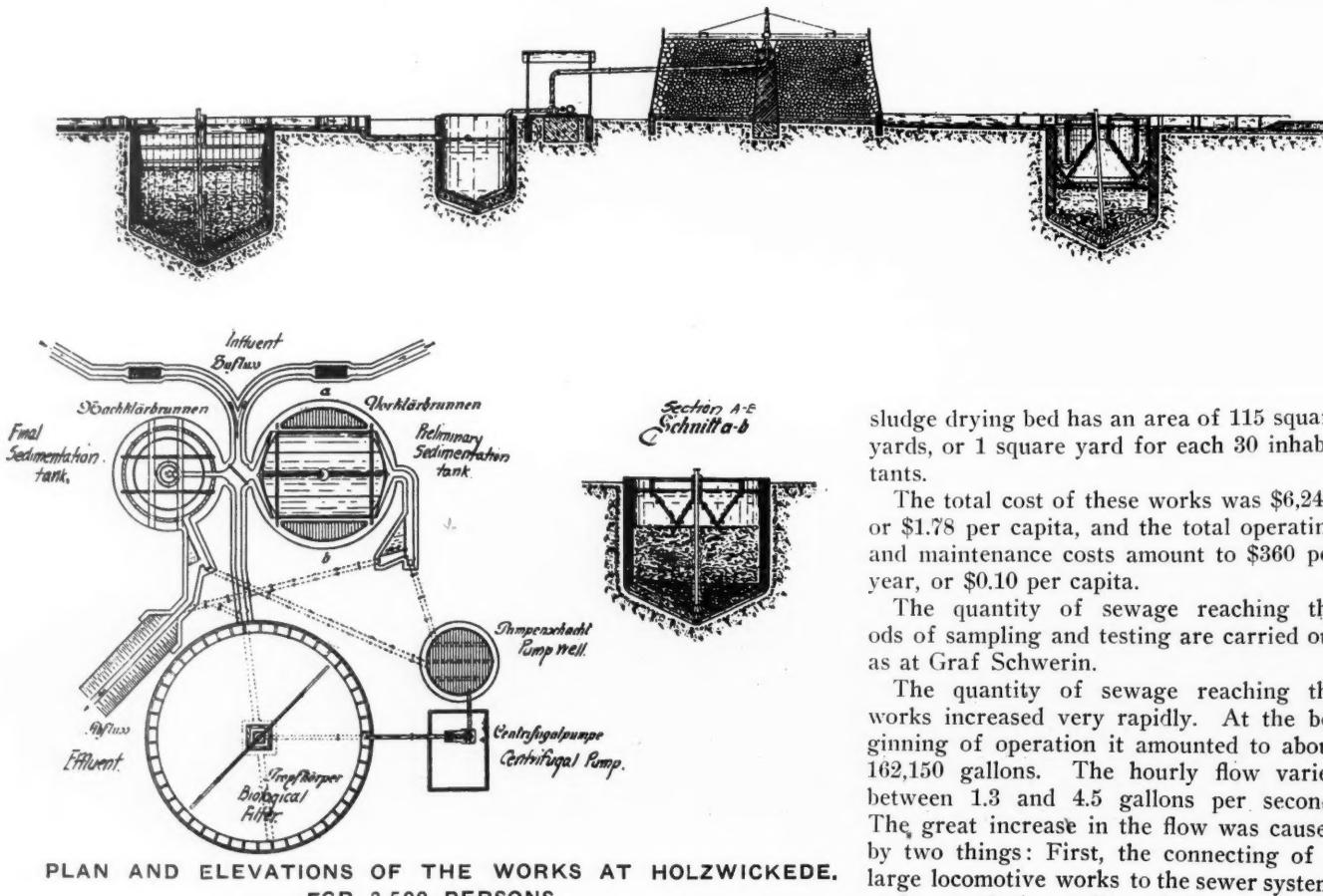
(Concluded from page 276.)

The colony of Holzwiede has a population of 3,500 and is located in the territory at the source of the Emscher river. Up to the time of the creation of the Genossenschaft the fecal matter was still utilized as fertilizer for the vegetable gardens, as at Graf Schwerin. Shortly after, however, a sewer system and a purification works were built. The brook upon which the colony is situated is the source of the Emscher river and at this point has a flow varying from 0.5 to 0.7 second feet. The water of this brook is also used for stock watering and flooding of meadows, and consequently biological filters were deemed necessary in connection with mechanical sedimentation.

The works consist of a screen, a preliminary and a final sedimentation tank, both of the Emscher tank type, and a biological filter. The preliminary sedimentation tank is 23 feet in diameter and 23 feet deep. The settling compartment has a capacity of 10,600 gallons. It was assumed that there would be a daily flow of 79,450 gallons and a maximum hourly flow of 6,625 gallons. The average detention period in the preliminary sedimentation tank is about 2 hours. The sludge digestion compartment has a capacity of 176 cubic yards and was designed to care for the sludge accumulations of about 6 months. The sludge is pumped from the tank into a tank wagon and removed

to the drying beds in it. This was necessary at these works because the country is so flat that it was impossible to obtain sufficient fall between the Emscher tank and the drying beds for utilizing the customary gravity sludge gutter.

The preliminary sedimentation tank was placed in operation in November, 1907, and for about one year its effluent was discharged into the stream without any further treatment. No harmful effects were noticeable in the brook during the period. After a time the sewage frequently reached the works in a septic state, due to the unfortunate conditions existing in the sewers and also to the increasing strength of the sewage. The mere settling of the sewage could not materially alter the septic state and at times the septic sewage was noticeable in the brook for about 300 feet below the works. The construction of the biological filter was then begun, because by this means the stream could be kept clean and the odors about the works reduced to a minimum. Its completion was hastened by threats of a suit by down-stream property owners. The filter is 33 feet in diameter and 13 feet high. The Emscher tank effluent flows into a pump well, from which a centrifugal pump raises it to the surface of the filter, where it is distributed by a revolving distributor. The filter is built of blast furnace slag and clinker. The clinker forms both the bottom and the top layers, each of which is about 19 inches in thickness. The slag is used for the remainder of the filter. The size of the clinker ranges from 2 to 3 inches and the slag from 1 to 1½ inches. In May, 1909, the filter was placed in operation and the river conditions immediately showed an improvement, although biological processes were not yet possible. Simple aeration of the sewage in the filter altered its disagreeable property, i. e., the hydrogen sulphide. During June, 1909, the final sedimentation tank was constructed and immediately placed in service. It is an Emscher tank of the vertical flow type and has a detention period of about one hour. The preliminary and final sedimentation tanks are operated interchangeably. The



sludge drying bed has an area of 115 square yards, or 1 square yard for each 30 inhabitants.

The total cost of these works was \$6,240, or \$1.78 per capita, and the total operating and maintenance costs amount to \$360 per year, or \$0.10 per capita.

The quantity of sewage reaching the works of sampling and testing are carried out as at Graf Schwerin.

The quantity of sewage reaching the works increased very rapidly. At the beginning of operation it amounted to about 162,150 gallons. The hourly flow varies between 1.3 and 4.5 gallons per second. The great increase in the flow was caused by two things: First, the connecting of a large locomotive works to the sewer system, and, second, the settling of the ground has

allowed considerable ground water to get into the sewers. The temperature of the inflowing sewage ranges from 61 degrees to 39 degrees Fahr. No operating difficulties due to freezing have occurred.

The solid contents of the influent and effluent of the preliminary sedimentation tank and the percentage reduction of the same are almost identical to those at Graf Schwerin. The very flat grades of the sewers cause considerable depositing of sludge, and, as above stated, H₂S was frequently present in considerable quantity. This condition has resulted in close inspection and careful management of the sewer system in recent years, and at present the state of the sewage reaching the works is much improved. Hydrogen sulphide is now detectable only during storms, when the increased velocity in the sewers disturbs the sludge deposits which in turn septicise the sewage.

The biological filter has always given very good results and is still continuing to do so, in spite of the fact that it is now caring for more than twice the quantity of sewage for which it was designed. The effluent has always been clear and non-putrescible.

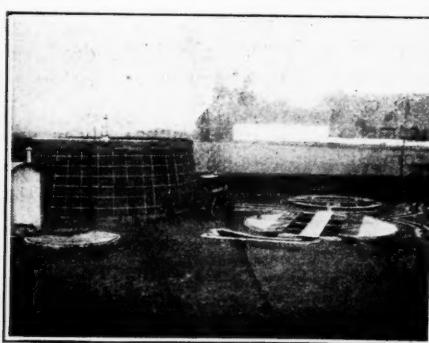
The final sedimentation tank is operated in connection with the preliminary tank. It was so constructed that its water level was the same height as that in the preliminary tank. It had been observed that decomposition in the final tanks took place more slowly and with less activity than in the preliminary tank. This was attributed to the different kinds of bacteria which were brought into contact with the deposited sludge. Putrefactive changes occur best under anaerobic conditions and consequently no aerobic bacteria can be present. In a preliminary sedimentation many anaerobic bacteria are brought into the digestion chamber with the unpurified sewage, but in the final sedimentation only aerobic bacteria are brought into the digestion chamber, due to the aeration which the sewage receives in the filters. This, then, explains the cause of the more rapid digestion of the sludge in the preliminary sedimentation tank. The suggested remedy was to simply interchange the tanks at intervals. This was done and has been found to give good results. Since the sludge digestion chamber of the final tank is so much smaller than that of the preliminary tank, it became necessary to arrange the flow so that the larger tank would always contain the greater amount of sludge.

The quantity of final sedimentation sludge amounts to about one-third of the preliminary sedimentation sludge. Sludge measurements in both tanks are taken at intervals of ten days and plotted as above noted. No differentiation is made between the two kinds of sludge, i. e., that settling from crude sewage and that settling from biological filter effluent.

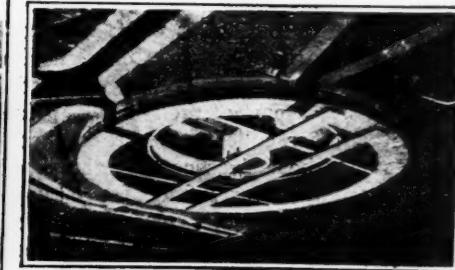
One attendant takes care of the works besides helping with the inspection and maintenance of the sewer system.



SINKING THE PRELIMINARY EMSCHER TANK
LIKE A CAISSON.



GENERAL VIEW OF THE PLANT.
VIEWS OF THE HOLZWICKE PLANT



TOP VIEW OF THE FINAL EMSCHER TANK.

The reason that no operating difficulties have as yet occurred is due to the fact that constant efforts are made to keep the sewage fresh and to maintain the very high efficiency of the preliminary sedimentation tank.

Table I* gives the average results of the chemical analyses carried out at the Holzwicke works. The average results of the sludge analyses are given in table II. The low percentage of water is due entirely to the efficient working of the tank. The high percentage of mineral matter is traceable to the considerable amount of street detritus and sand. The dried sludge is almost identical with the decomposed sludge, except in the water content. The dried and the decomposed sludge are entirely inoffensive and the odors are, respectively, those of tar or burned gum and of peat.

GENERAL CONCLUSIONS.

The following general conclusions regarding sewage works have been drawn from a study of these plants:

1. To avoid odors and to successfully operate a sewage works require that the sewage be kept fresh. Sludge deposits in the sewers should also be avoided, because they will cause the sewage to become septic. Hence the necessity of clean, good sewers with good gradients.

2. Screens should be utilized only for retaining the coarse impeding matters.

3. Slag filters have proved efficient and are capable of withstanding temperature and weather conditions. Before building biological filters, however, it is necessary to consider the local conditions very carefully, at the same time keeping in mind the enormous costs of their construction and operation, in order to determine whether their construction is absolutely necessary. Frequently it will be found that a mechanical clarification works will produce the desired result.

4. Devices for distributing sewage automatically are yet in an imperfect stage, and there is need for a good, simple acting device.

5. As an adjunct to biological filters, a final clarification tank is generally necessary. For successful and simple operation, it is often expedient to interchange the final and the preliminary sedimentation tanks, so that the sludge digestion will proceed actively and rapidly.

6. Emscher tanks have given excellent results in every way when used, both as preliminary and final sedimentation tanks. Furthermore, their effluent is well suited for biological treatment because the sewage is kept fresh.

*See page 275.

SMOKE INVESTIGATION AT PITTSBURGH

THE Department of Industrial Research of the University of Pittsburgh is about to undertake a study of the smoke problem in the broadest possible manner. It is intended to investigate the effect of smoke on health, plant life and buildings, and the increased cost of living, due to damage and dirt caused by smoke, the problem being considered from the legal as well as the engineering side. It is hoped by co-ordinating these various researches to obtain some valuable technical and scientific data.

We understand that the department is at present making preliminary arrangements for this work, and is anxious to get in touch with others interested in the matter for the purpose of obtaining their co-operation, information and suggestions.

GARBAGE COLLECTION IN MILWAUKEE

Collectors Hired by the Day—Amounts Collected—Time Consumed—Weight of Garbage—Night Collections —Recommendations

THE Bureau of Economy and Efficiency of Milwaukee, Wis., to which we have several times referred, which was created by Common Council in 1910 "for the investigation of departmental accounts and methods," has just published its twelfth bulletin, in which are given the results of its study of the collection of garbage in that city and suggestions for the reorganization of the system.

Garbage collection is a part of the duties of the Division of Street Cleaning of the Department of Public Works and is in charge of a superintendent of garbage collection. Ninety-five collectors and carts are employed during the winter and ninety-eight during the summer. Garbage is collected from all residences in the city and also from all its business places, with the exception of some hotels and restaurants and the wholesale quantities of spoiled food from the commission houses. Each of the collectors is given a district, and these are supposed to be so divided and placed that he can obtain from it two loads in each working day. In fact, no hours are designated, but two loads of garbage delivered at the incinerator is called a day's work. In winter collections from residences are supposed to be made once a week, and from the business section and hotels from one to five times per week; while in summer collections are supposed to be made twice a week from residences and from one to six times in the business section. The collectors work only five days a week in winter and six days in summer. All garbage is collected between midnight and 8 a. m. in summer and 9 a. m. in winter. The incinerator does not receive garbage before 3 a. m., so that some of the collectors find it useless to begin work before 1 or 1:30 in the morning.

The wagons used are single horse, with removable sheet metal boxes which are equipped with hinged covers. The capacity of a wagon is about 1½ cubic yards. The horses and running gears are furnished by the drivers, while the boxes are owned by the city.

A State law provides that suitable covered receptacles for garbage, ashes and rubbish shall be furnished by the property owner, and a city ordinance requires that these be placed at a point on the premises most accessible to the person collecting garbage. But neither of these requirements is rigidly enforced.

The investigators found several objectionable features in this method of collecting garbage. Practically the only check on the collectors seemed to be the requirement that they bring to the plant each day two loads of garbage, weighing about 1,200 pounds each, and complaints were numerous and continuous of failures of the collectors to remove all garbage in their district. In some cases collectors who had a district well removed from the incinerator collected a part of their first load from the nearby district of another collector before he had made his rounds, thus saving themselves considerable haul. In other cases the wagon was nearly filled from two or three large establishments and a great many of the residences were neglected. Moreover, the districts were so divided and assigned that certain collectors had to put in a great deal more time to cover their districts than did others. Of seventeen collectors observed, two worked over eight

hours, five worked from seven to eight hours, six worked from six to seven hours, three worked from five to six hours, and one man worked only three and one-half hours.

It was observed that the wagons were only infrequently washed on the outside and apparently were never washed on the inside, which carelessness probably would not have been allowed to exist had the collections been made during the day.

Actual weights were taken of all loads received during four months. During this time 15,920 loads were weighed, and the average weight was found to be 1,198 pounds. As the wagons hold 1½ yards each, this would indicate a weight of about 800 pounds per cubic yard. Figures from 16 cities, collected by Chas. V. Chapin some years ago, gave the average weight of garbage as 1,405 pounds per cubic yard; but for some reason no such weight as this was obtained in Milwaukee except by an occasional load. It was found that a full wagon load of garbage in summer weighed 18½ per cent. more than a full wagon load in winter.

It was also found that in some instances the horses used by the collectors were old and entirely unfit for the work; and the same applies to certain of the collectors themselves.

The bureau then proceeded to devise a system for securing economy in the collection as well as more satisfactory results. They divided the city into a different set of districts, and assumed that each collector would work eight hours a day, regardless of the number of loads collected. Allowing for the inability to always secure a full load on the last trip, they calculated that 76 collectors could easily cover the entire city, in place of the 95 which were then in service.

The system of working five days a week in winter and six days in summer was retained to provide for the additional amount of garbage which requires collection in the latter season, this being about 20 per cent. greater than that collected in winter.

It was found that the horses, after collecting their loads, hauled them to the incinerator at rates varying from 4.48 miles per hour to 3.04 miles per hour, the rate almost invariably increasing with the distance to be covered. It was assumed that a uniform rate of four miles per hour would be practicable.

Concerning night collections the report says: "There are very apparent reasons why night collections reduce the efficiency of the service. At the best, work must be slower in the dark than by day light, but the greatest danger of inefficiency is that the collector who may be inclined to loaf under cover of the dark is free from observation and possible criticism of the public or his immediate superiors. Reliable figures show that in most cities garbage is collected during the day time. With hours arranged so that the work would be finished at noon, all collections could be made in day light, except possibly in the shortest days of winter. Proper care of the wagons would remove the principal objection to having them on the streets during business hours."

Wagon boxes, says the report, should be kept clean and should be deodorized frequently. In most cities there are rules governing the care of wagons. While there is a great variety of requirements as to disinfection or deodorization, daily washing seems to be the general practice. "It is recommended that every wagon box be thoroughly washed every day after the delivery of the last load; and that in addition to this cleaning, each box to be sprayed at least once a week with a disinfecting and deodorizing fluid. The most effective and probably cheapest deodorizer will be found in the coal tar group, of which there are many compounds on the market. A frequent inspection of the wagons should be made by someone detailed from the office of the superintendent of street cleaning to insure a proper compliance with these requirements."

Among the other recommendations are the following: "Each collector should be made responsible for keeping the garbage cleaned up in a definite territory, with instructions that repeated, well founded complaints will be sufficient cause for discharge.

"Collections from the business section should be made five times a week in winter and six times a week in summer; from all other parts of the city at least once a week in winter and twice a week in summer." It was estimated by the bureau that a saving of \$17,262 might be effected by reducing the number of collections, and that the added cost of keeping wagons clean would be about \$846 a year. It was stated, however, that if required to work eight hours a day the regular rate of \$3.50 for a single team would probably be demanded, while only \$3 was being paid. If this increased pay were allowed, the saving would still be about \$5,700 a year.

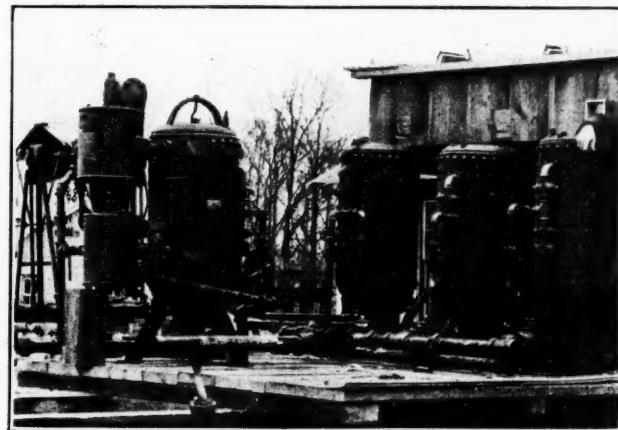
In September, 1911, the superintendent began experimenting with four-yard wagons drawn by two horses for collecting garbage. The wagons used were bottom dump wagons, which are not water tight, and while they appeared satisfactory for hauling winter garbage, they undoubtedly could not be used for garbage in hot weather. The cost of operating one of these was \$5 a day for a driver with two horses and \$2 a day for helper. The amount of garbage carried was so much greater, however, that a saving could apparently be effected of about \$4,000 a year by the use of the larger wagons; and it was recommended that special four-yard water-tight wagons be provided.

GROUTING AQUEDUCT TUNNELS

In constructing the seven pressure tunnels of the Catskill aqueduct of the new New York water supply, every effort is being made to make these water tight, one of the precautions being to force cement grout between the concrete lining and the wall and into any seams in the rock. This is done after the concrete lining has all been placed and has thoroughly set.

The Degnon Construction Company has the contract for the Wallkill tunnel, and the superintendents of that company have designed an outfit for grouting by which a speed has been attained of two batches a minute. The outfit is worked continuously in three 8-hour shifts a day, and 200 to 300 lineal feet of tunnel a day has been grouted.

This outfit consists of four ransome-Canniff grout mixers and an air compressor set up on a heavy platform on wheels. The mixer nearest the compressor is used exclusively as an air receiver. The other three mixers are connected up in a battery, but the end one is so connected that it can be shut off from the other two mixers and used separately. By this arrangement the three mixers can work together under any pressure up to 300 lbs., and if



WALLKILL TUNNEL GROUTING OUTFIT.

necessary the end mixer can be cut off from the other two and worked separately under 300 lbs. pressure, while the other two mixers continue to eject under 75 or 100 lbs. pressure. This has resulted in a large saving of time and expense. The rear end of the platform is used to pile bags of cement upon, and from this point the cement is emptied into the hopper-like affairs above each mixer.

In grouting the Rondout pressure tunnel the same type of grout mixers are used, a battery of three mounted on a car being connected up to two $9\frac{1}{2}$ x 5 x 10-inch air compressors. The compressors are used to raise the pressure to 350 pounds, when necessary, the normal direct-line pressure being only 100 pounds. An air compressor made of a piece of 12-inch wrought iron pipe, 5 feet long, is used between the compressor and the tanks.

RAISING A TOWN EIGHT FEET

WILMINGTON, Cal., a recently annexed suburb of Los Angeles, presents a queer appearance at present, as the greater part of its buildings are now elevated eight feet above their former level. The impression given is that of a town on stilts, as many of the structures are standing on temporary supports of timber. The reason for this raising of the little city is that, as Wilmington was on very low ground, and the nearby harbor is being dredged, it was decided to utilize the dredgings and improve the town at the same time. Therefore a bulkhead was erected about the land to be filled and dredger pipes, laid over the streets and vacant lots of the town, convey the discharge from the suction dredge, consisting of water, sand and shells.

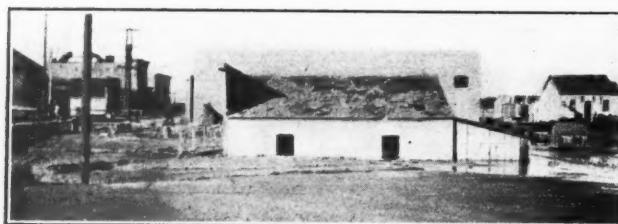


CHURCH AND STORES RAISED, AWAITING FILL.
Manholes show height to which dredgings will rise.

The city of Los Angeles, which is paying \$258,000 for this harbor improvement, also assumed the cost of raising the houses above the level of the fill. While most of the buildings were raised on light frames of timber, the brick structures were placed on substantial foundations and in many cases were furnished with basements by building a waterproof foundation wall of concrete below their floor level, which was later buried under the filling. Owners of vacant lots did the same thing, building a substantial basement in preparation for some future business block. A few old buildings that were not worth saving were allowed to remain as they were, and to-day present a curious spectacle, with the sand filled up well toward the eaves.



MAIN STREET RAISED $8\frac{1}{2}$ FEET.
Dredge pipe shown at the left.



HALF-SUBMERGED SHED, NOT WORTH RAISING.

An area of about 20 blocks will have been filled when the dredging is completed, a total of 1,200,000 cubic yards. As a result, the town will be set high and dry above the harbor, will be rendered more sightly and better drained, and the principal streets will be on a level with the docks at which the steamers load and discharge cargoes.

CONCRETE HIGHWAY BRIDGES

Reinforced Concrete Fire, Rust and Expense Proof—Types for Various Spans—Principles of Design

Paper by George H. Herrold, Office Engineer, Dept. of Pub. Wks., St. Paul, Minn., before the Minnesota Engineers' Society.

REINFORCED concrete is the structural material best adapted to the construction of permanent highway bridges and culverts, for it is durable, fire proof, rust proof and expense proof (for it requires no painting or renewing of floors or repairs, and in fact it increases in strength with age, while steel and wood deteriorate), and of relatively low cost, for in general the sand and stone or gravel which form the great bulk and weight of the concrete can be secured from near-by pits or quarries or from the immediate site of the work by the proper washing of the gravel to remove loam and clay. This also gives employment to local laborers and encourages the operation of local gravel washing and crusher plants.

This may be better illustrated by taking the actual quantities in a given structure, for example, a 60-foot reinforced concrete girder bridge, 16-foot roadway and 15-foot abutments, contains approximately 200 cubic yards of concrete. Reducing the quantities of the various materials required for the construction of this bridge to tons we have the following:

Cement, 47 tons; steel rods, 12 tons; form lumber, 13 tons, and sand and gravel 404 tons, or the ratio of the cement, steel and lumber which would have to be hauled to the site of the work is to the weight of the aggregate, which we will assume can be secured at the site of the work, as 1 to 6.

A reinforced concrete bridge should be designed by a competent concrete bridge engineer. The details should receive the same attention as would be given to a steel bridge or building. The construction should be carried out by competent contractors. A cement sidewalk builder is not necessarily qualified to build a reinforced concrete bridge just because he has mixed sand, water and cement together and allowed it to harden.

Reinforced concrete bridge building is a business requiring the best skill and the highest constructive ability. Inspectors should remain on the work constantly. Intermittent inspection of concrete work is valueless. Inspectors must see the actual processes carried out, check the work with the plans as to the dimension of the finished work and the sizes and placing of the reinforcing. See that forms are built to produce the plan dimensions, and that they are properly supported and braced so as not to sag under the weight or bulge, destroying the straight lines of the finished work. The time for the removal of the forms is an important one, and the hardness of the concrete must be determined very carefully. See that bars are properly spliced to transmit the stress one to another. In general,

the plans should show where the splicing should be made so that it will not come at point of greatest stress.

The various types of reinforced concrete bridges and culverts adapted to highway work are the reinforced concrete box culvert, the slab floor supported on abutments, beams carrying a reinforced floor; the reinforced through or deck girder, the concrete pile bridge, the reinforced concrete arch and the ribbed arch. A study of the location should be made to determine the best and most economical type to select. Generally speaking, for openings up to 8 feet the reinforced concrete box is the proper type to use, as it is more economical in material than the plain abutments, supporting a slab floor. For spans 8 feet to 20 feet, use the reinforced slab. For spans 20 feet to 30 feet, reinforced concrete beams carrying a thin, reinforced slab is probably more economical in material. For spans 30 to 60 feet, with roadway not over 20 feet in width, the reinforced concrete girder supporting a slab floor is undoubtedly the best design for highway work. It's a massive structure of pleasing appearance and gives the maximum waterway for the span length.

For long openings, where there is no drift to be contended with, or for approaches to spans over a stream or railroad tracks, the reinforced concrete pile bridge with slab floor is very economical in material; in fact, it is a type worthy of more consideration than has been given it for highway work.

Arch construction is a desirable type in crossing deep ravines, but where the head room is low, requiring a flat arch and massive abutments to take the thrust, they are not desirable nor economical on account of the large amount of material required. They should not be built except where there is a stone foundation, as there is danger to their stability from a slight settlement of the abutments. This applies to highway work where utility and cost are the first considerations. For parks and approaches to towns and cities, where cost is not the first consideration, the arch is a very desirable type. Concrete railings should be used on all concrete bridges, as they add to the massive appearance.

It is not the purpose of the writer to take up the theory of design, but he wishes to call attention to one or two points that must be given attention in designing a reinforced concrete bridge. If we consider the tensile stress acting in the reinforcing steel in the bottom of a girder or beam or slab floor, it is plain that there must be a corresponding and opposite stress which is the bond between the concrete and the steel and this resisting stress must be greater than the tensile stress in the steel to insure the integrity of the structure. For this reason bars that are deformed are better than plain round or square bars, provided the concrete is tamped to fill the deformations. Also bars that are spaced some distance apart develop more bond resistance than those close together; also small rods are better than large ones within certain limits, as they have a greater frictional surface for the same total cross-sectional area of steel. Actual tests of concrete beams show that the depth of a girder or beam should be limited to between 1-20 and 1-10 of the span. The width of the top of a girder would be determined by the compressive stress and the width of the bottom of the girder by the amount of steel to be embedded in it.

Specifications should cover three classes of bridges for highway work—one to cover main highways leading to cities and town; one for auxiliary roads or feeders to the main highway and one for cross country roads, used by the settlers in getting to the roads of the other two classes. The live loads used for designing bridges of these three classes would be a 20-ton, 15-ton and 8 or 10-ton road roller. This would reduce the cost on little used roads and still permit bridges of a permanent character to be built and eliminate the maintenance cost of temporary bridges.

Municipal Journal

and Engineer

Published Weekly at
50 Union Square (Fourth Ave. and 17th St.), New York
 By Municipal Journal and Engineer, Inc.
 Telephone, 2805 Stuyvesant, New York.
 Western Office, 1441 Monadnock Block, Chicago

S. W. HUME, President

J. T. MORRIS, Manager. A. PRESCOTT FOLWELL, Secretary
 A. PRESCOTT FOLWELL, Editor
 F. E. PUFFER, Assistant Editor

SUBSCRIPTION RATES

United States and possessions, Mexico, Cuba...\$3.00 per year
 All other countries..... 4.00 per year
 Entered as second-class matter, January 3, 1906, at the Post
 Office at New York, N. Y., under the Act of
 Congress of March 3, 1879.

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FEBRUARY 29, 1912.

CONTENTS

Electric Street Lighting. (Illustrated).....	305
German Sewage Purification Works. (Illustrated).....	308
Smoke Investigation at Pittsburgh.....	309
Garbage Collection in Milwaukee.....	310
Grouting Aqueduct Tunnels. (Illustrated).....	311
Raising a Town Eight Feet. (Illustrated).....	311
Concrete Highway Bridges.....	312
The Fundamental Principle of Sewage Disposal.....	313
Waste Utilization in Pittsburgh.....	313
Staking Out Street Work.....	314
News of the Municipalities. (Illustrated).....	315
Legal News—A Summary and Notes of Recent Decisions.....	324
Municipal Appliances. (Illustrated).....	325
News of the Societies.....	327
Personals	328
Industrial News.....	328
Patent Claims. (Illustrated).....	329
The Week's Contract News.....	330

The Fundamental Principle of Sewage Disposal

REPORTS concerning sewage disposal into waters used for municipal supplies, made to two of the larger cities of the country, by several of our foremost engineers—John W. Alvord, Harrison P. Eddy, Allen Hazen, Geo. C. Whipple and F. P. Stearns—have recently been published and are of unusual interest for several reasons. The cities in question are Milwaukee, with a population of about 400,000, which is situated on the west shore of Lake Michigan at the outlet of three rivers, and Pittsburgh, with a population of about 550,000, which is situated on the Ohio River. Each city discharges its sewage directly into rivers which flow through it. Milwaukee draws its water supply from the lake into which flow the rivers which receive its sewage. The Ohio River is used as a source of water supply by cities located down stream from Pittsburgh. The two cases therefore represent the two general conditions under which might be classed almost every instance of pollution by sewage of water used for public supplies. In the case of Milwaukee, the report was ren-

dered by Messrs. Alvord, Eddy and Whipple; the Pittsburgh problem was reported upon by Messrs. Hazen, Whipple, Stearns and Eddy. Milwaukee was induced to seek advice because of the nuisance created in the rivers which receive its sewage and to a certain extent because of the danger of pollution of its water supply thereby. Pittsburgh has been practically ordered by the Pennsylvania State Board of Health to purify its sewage before discharge into the river, and in connection therewith to build a complete system of separate sewers to insure that no untreated house sewage reach the river.

Both reports advise against further purification of the sewage than the clarification required to prevent local nuisances, with the exception that Mr. Alvord believes that percolating filters should be added when an outfall sewer is built discharging the sewage directly into the lake, as should be done in a few years. In the case of Pittsburgh, it is claimed that there are many other sources of pollution of the Ohio which it is practically impossible to suppress, and also the cost of building the separate system of sewers and of completely purifying the sewage is much greater than it would cost to adequately filter the water supplies of all the cities affected by this pollution. In the case of Milwaukee, also, it is considered that there are many other sources of pollution, such as other cities on the lake, steamboats, etc., which cannot be controlled, and here, also, the cost of filtering the water would be less than that of removing all dangerous organisms from the sewage. No great city, so far as Messrs. Hazen and Whipple know, has purified its sewage to protect the public water supplies of other cities, and in the case of Milwaukee we find it considered inadvisable to thoroughly purify the sewage in order to protect its own water supply.

If large cities discharge merely clarified sewage into the streams there certainly could be little advantage or justice in requiring the small towns to purify their sewage to a greater degree. Consequently, if the opinions of these engineers are accepted the only aim in connection with river and lake pollution is to avoid a nuisance, leaving the matter of eliminating the pathogenic bacteria to be accomplished by filtration of the water supplies derived from those streams or lakes.

On the other side are many, if not most, of the State Boards of Health, which would secure as high a degree of purification as practicable with a view to maintaining our streams in a condition as nearly approaching that of their original purity as possible. It seems probable that the Pittsburgh case may be taken to the courts. In fact, it is to be hoped that this will be done, and promptly, and that all of the leading sanitarians of the country be called upon to testify as experts, since this is at present the most important and fundamental principle of all sewage disposal problems.

Waste Utilization in Pittsburgh

A SCHEME for utilizing the city's waste and at the same time provide occupation for hundreds of persons is about to be inaugurated in Pittsburgh under the direction of the advisory board and finance committee of the Pittsburgh Association for the Improvement of the Poor. The idea is to collect the city waste and have it sorted by an industrial branch for men. Headquarters for the work has been provided by Mrs. William Thaw, who gives the use of a large corner lot free of rent, together with a number of buildings which can be utilized for the work. In these buildings will be located a waiting room for applicants and an office for the general manager, as well as rooms for sorting the waste, for repairing such articles as are salable and the display of these for sale. The contract has been let for a two-story brick stable to accommodate 16 horses and for a wagon shed. A fund of \$25,000 is being raised to start work on the scheme.

STAKING OUT STREET WORK

Methods Employed by Majority of City Engineers in Iowa for Curbs, Gutters and Street Paving

In a paper before the Iowa Society of Engineers last week Mr. Theodore S. De Lay presented a paper in which he gave the results of inquiries conducted by him into the methods employed by Iowa engineers in setting stakes for sidewalks, curbs, gutters and street paving; also in calculating the contents of concrete walls. Answers were received from 41 engineers to one or more of the following questions:

1. In setting stakes for sidewalks, curbs, gutters, etc., do you set the top of the stake to grade, or do you drive the stake to a firm bearing, take its elevation and furnish the contractor a grade sheet telling how much to cut or fill from the top of each stake?

2. In providing for the crown and grade of pavement after the curbs are in, do you set the stakes across the driveway, or do you give the contractor a grade sheet showing cut or fill from a line between the curb tops at each station for the crown, quarters and other points if needed and let the contractor set his own stakes by means of a line or boning rods when he is ready for them.

3. In calculating the cubic contents of concrete wall, would you follow the old masonry custom of calculating all openings solid and doubling all angles, or would you figure the actual cubic contents, nothing being indicated in the contract and specifications?

In answering question 1, 25, or 61 per cent. of those replying, favored the method of setting stakes to a firm bearing and indicating the cut or fill from the top of the stake by either grade sheet, marks on the stakes, profile, etc., and the remainder, or 39 per cent., favored the practice of setting the top of the stake to grade. The towns from which replies were received varied in population between 2,000 and 86,000, but both large and small seem to be quite evenly divided between the two sets of replies.

Concerning the giving of grade for roadway pavement, 22, or 54 per cent., favored requiring the contractor to take his guide from a line between the curb tops as indicated by grade sheet, profile, cross-section or other written instruction; 14, or 34 per cent., favored setting stakes to grade across the roadway, while five employed methods differing from both of these.

A number of the answers to these two questions indicated that the engineers replying used both methods, in which case Mr. De Lay used his judgment in determining which method was apparently favored. His own opinion is that it is best to set stakes for sidewalks, curbs, gutters, etc., to a firm bearing, drive the top of the stake close to the surface, take elevations and give the contractor a grade sheet or other written instruction telling him the amount of cut or fill from the top of each stake, his reasons for this opinion being:

1. This method is the easiest and quickest method, and I presume that every competent engineer is sufficiently busy to feel the appeal of that point.

2. One set of stakes serves for both preliminary grading and finish work, and the second leveling, which should be done just before the finish work, serves to check both any disturbance of stakes and any error of the first leveling.

3. Stakes set by this method are all solid and out of the way of accidental injury and are not so readily visible as to attract the attention of mischievous or malicious persons.

4. The use of the grade sheet or written instruction compels the contractor to keep track of the stations, and it is thus easy to direct him with instructions written on

the grade sheet when a deviation from the usual form of construction, such as different exposure of curb, different slope of sidewalk or the location of a catch basin, is desired at any particular point.

5. Stakes set by this method are more likely to survive until the final inspection than are stakes set to grade, and they may then be very useful in evidence should any serious errors of the constructor escape the daily inspection.

6. If it is necessary to make a preliminary survey and establish grade for the work, the stakes may be set during the preliminary survey, and the levels taken on them at that time are sufficiently exact for making profile and establishing grade. The same stakes may then be used throughout the work, giving the engineer the benefit of three levelings, if need be, on the same stakes.

In regard to the second question, Mr. De Lay believes it best to set no stakes across driveways for indicating crown and grade of paving after the curb is in, but to mark the curbs in short stations and give the contractor a grade sheet, cross-section or profile showing the cut or fill from a straight line between the curb tops at each station for the crown, quarters, and other points, if needed, letting him set his own points by means of a line, boning rods, tee boards, templates or other suitable devices, his reasons for this opinion being as follows:

1. This method is the easiest for the engineer, because he can prepare the instructions for the whole job at once and have the matter off his hands.

2. It is best for the contractor, as, having once mastered his system of setting points, he can go ahead and promptly set points for subgrading, foundation, or surface, just when and where he is ready to use them without waiting for the engineer, thus keeping his force going and saving loss of time and money.

3. With this method every item of instruction is preserved and available after the work is finished, while with the method of setting stakes across the driveway the stakes are necessarily destroyed when the work is completed and no evidence is available except the engineer's notes to determine whether mistakes, if they occur, are due to errors of the engineer or of the contractor. Now it is doubtful if any contractor ever existed who, after the stakes were destroyed, would acknowledge even to himself that he failed to set the work in exact accord with the stakes and every workman employed will sustain the contention of the contractor, while the engineer will have, for purposes of establishing the accuracy of the destroyed stakes, only the evidence of himself and possibly his assistant, together with level notes, which are Greek to the ordinary man.

Is it at all surprising then that, where the system of setting stakes across the driveway is used, errors and irregularities in the crown and grade of the finished pavement are popularly attributed to mistakes of the engineer? How much more satisfactory would it be to so arrange that anyone may stretch a line between the curb tops and with tape and foot rule determine definitely if the finished surface is in accordance with the written instructions, thus locating the responsibility for errors in a way intelligible to anyone.

4. The knowledge that responsibility for errors can be definitely placed at any time will make both engineer and contractor more careful, thus helping to produce work which will be a credit to both.

In replying to the third question concerning the measuring of concrete masonry walls, 85 per cent. of the replies favored payments on exact measurement, 5 per cent. were indefinite and 10 per cent. favored following the old masonry custom of doubling corners and making no deductions for windows or similar openings. Concerning this Mr. De Lay said: "It is in the interest of good engineering that all obscure and questionable practices like this old masonry custom should be discouraged."

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance

ROADS AND PAVEMENTS

Front-Foot Paving Plan for Houston

Houston, Tex.—By a vote of 3,766 for and 2,372 against, the citizens of Houston in formal election have adopted the front-foot paving plan and wrote the same into the charter of the city as an amendment. Nine voting precincts out of twenty-two gave small majorities against the amendment, while the other thirteen precincts went heavily for the new plan. The front-foot plan in this instance means that hereafter in Houston property owners will pay for two-thirds of the cost of the paving in front of their property, the city at large paying for the other third.

Fined for Bonfires on Wood Paving

Chester, Pa.—Determined to put a stop to the practice of people burning waste paper on the newly-paved streets, which were laid last summer under the provisions of a \$600,000 loan bill, Commissioner of Highways Watson prosecuted a case against J. F. Craven, a West Third street merchant, charged with burning waste paper on the new wood block paving in front of his store. He was fined \$5.

Engineer Suggests Classification of Old Pavements

Scranton, Pa.—The City Council has recently received from J. W. Howard, consulting engineer, New York, some suggestions for the improvement of the asphalt pavements. Among other suggestions, Mr. Howard advises that all the pavements of the city, particular attention being given to the old ones, be inspected and classified by groups of kinds, ages, present condition, etc., with a definite plan and recommendations in regard to each, as to what is best and most economical to do to put them in repair by patching, resurfacing, relaying or otherwise during the next few years.

Pavement Finished Early in Season

Greenville, Tex.—The bitulithic pavement has been completed on Pickett street from Wesley to Johnson street, and the thoroughfare opened for traffic. The wood block pavement is being laid on Washington street from the public square to the Katy Railroad, more than two blocks of the pavement being completed. The driveway around the post office on the Federal Building lot has been paved with the creosoted wood blocks.

Grading Stamford's Streets

Stamford, Tex.—The City Council is carrying its street improvement to the west side of the city. All streets in what is known as Bomer Heights are now being graded and put in good condition. The City Council has made a wonderful record in street improvement and few, if any, towns in the State the size of Stamford can compare with the streets, sidewalks and crossings of this city.

Street Work Commences Early in Dallas

Dallas, Tex.—Fair weather of recent weeks has permitted rapid progress on many street improvements and other public works under way by the city. City Engineer Preston said that work was going ahead rapidly upon the paving of Grand avenue from the Fair Grounds to Ervay street, of which improvement a bridge just completed is a part. Concrete and blocks are both being laid now. Concrete has been laid in the Pennsylvania avenue storm sewer to the Colonial avenue crossing, and, Mr. Preston says, Colonial avenue will now be opened for traffic again at that corner. Concreting has started on North Akard street, between Routh and McKinney. This is the foundation for a paving of creosoted pine blocks. The paving of Jefferson, from Tyler to Tenth, a mile and a half of asphalt-macadam surface, has recently been completed, after four or five months of work. Wearing surface is being placed upon Cole avenue, from Collett to Carroll. All concrete and foundation work is completed and the surface about half laid. The street car company has commenced concreting its tracks for the paving of Live Oak, from Munger Boulevard to Cantrell. This is to be laid with bitulithic. The street car company concrete work has been finished from Washington to Hall.

Work on Good Roads Nearly Doubled in Year

Albany, N. Y.—An extraordinary amount of road work was done last year on the State and county roads as compared to the previous year, according to the annual report of State Highway Commission which has been submitted to the Legislature. Last year 932 miles of new work were started and 540 miles completed, while in the previous year 513 miles were started and 430 miles finished. This year the Commission will work on 1,800 miles of good roads, both State and county, at an approximate cost of \$22,000,000. The commissioners report that 5,907 miles of country roads and 1,340 miles of State roads will have to be laid in order to complete the original system of good roads in the State. To this end a new \$50,000,000 bond will be required and it is asked for. The Commission recommended the planting of shade trees along the roads of the State and asks for the co-operation of the Conservation Commission. The abolishment of all toll bridges is called along the Mohawk, Delaware and Hudson rivers. The necessity for improving all roads which are feeders to the State system was brought to the attention of the town boards. The Commission is composed of State Superintendent of Highways C. Gorden Reel, State Engineer Bensel, State Superintendent of Public Works Peck, and took the place of the Highway Commission created under the Hughes administration.

City Engineer Favors Oil Sprinkled Streets

Dayton, O.—In discussing the movement that has been inaugurated with a view to bringing about the substitution of oil or some other dust-preventing agency for water in the sprinkling of the unpaved streets of Dayton, City Engineer Cummin stated that he regarded it poor policy to sprinkle any of the thoroughfares with other than oil or some other substance equally efficient. "Oil sprinkling is more satisfactory in every way and the expense is not any greater," added Mr. Cummin. "Furthermore, we simply can't spare the water, and in the event oil is not used pretty generally, I am fearful that there will be considerable complaint originate from the dust nuisance the coming summer." When asked whether or not the use of oil would be equally satisfactory on paved streets as on the unpaved streets, City Engineer Cummin stated that he is not yet prepared to say, but that he is making an investigation to the end that he may have some means of determining with definiteness.

City Contemplates Building an Arcade Concrete Bridge

Johnstown, Pa.—The City Councils are considering plans to replace the steel bridge which crosses the river on one of the main thoroughfares of the city by erecting an arched concrete bridge, provided with stalls on both sides. These stalls can be rented for market purposes, and the promoters claim that the city can derive a handsome revenue each year, which will pay a high rate of interest on the money invested.

Recommend Opening Highway to Relieve Congestion

Washington, D. C.—The recommendation made by the District Commissioners to Congress during the past week for the opening of Alaska avenue from its beginning, at Georgia avenue and the district bounds, in a southwesterly direction to its intersection with Fourteenth and Sixteenth streets extended, marks another effort to relieve congested conditions growing out of the increase in the population. Georgia avenue is the old turnpike road providing communication between Montgomery County, Md., and the District. As a thoroughfare it has not become out of date. It is just as much a highway as when it was practically the only direct avenue between Maryland and the city. In spite of the opening of new roads, the vast increase in the number of people in Washington has thrown a burden of travel upon the old pike that now demands relief. The proposed connection between such thoroughfares as Sixteenth and Fourteenth streets will divert a large portion of the tide of travel which now enters the District at Georgia avenue into the newer streets.

Providence Will Use Oil More Generally

Providence, R. I.—Commissioner of Public Works states that as a result of the city's experience during the past few years he is convinced that the use of oil in streets is far better than water, but there are difficulties to be overcome before the method would be perfect. The most common difficulty, he said, was that due to the muddy conditions that exist on the streets after oiling, due to the heavy traffic over the roadway causing the fine particles of the roadbed to come to the surface. It is the intention to keep close watch on road oiling in other cities, with a view to the adoption of improved methods as they develop. Providence is now using oil containing 30 per cent. of asphalt. Last year forty miles were oiled and this year the use of oil will be much more universal.

Will Place Road Signs in Northern New York

Watertown, N. Y.—A total of 155 road signs will be erected throughout Jefferson County as early as the weather will permit by the Watertown Automobile Club. The local club will work as far south as Pulaski, connecting with the Syracuse club, which will erect road signs to that point. The signs will be in blue and white, of metal, and will show distances to villages, direction, etc. Danger signs will also be placed on bad hills and curves. The number of signs ordered will take care of all the main traveled roads in the county and will be of great value to tourists on their way to the Thousand Islands, Henderson, Cape Vincent and other summer resorts.

Knoxville's Record on Paved Streets

Knoxville, Tenn.—Knoxville now has nearly twenty-four miles of paved streets. Of this amount, twenty-one miles have been laid under the abutting property law. During the year 1911, the city paved more than one and one-half miles of streets, not including the cheaper grade of paving. The record at the City Hall shows that Knoxville has 23.681 miles of paved streets of the higher grade paving. Cheaper grades have been put down as sample paving on Park avenue, from Gay street to Broadway, and on State street, in front of the Elk's home. The records show the following, by miles:

	Miles.
Sheet asphalt	12.862
Brick	5.038
Granitoid	4.010
Bitulithic	2.309
Tarvia macadam .....	.092
Total	23.681

Besides this, Knoxville has two miles of oiled macadam streets. All of this paving, with exception of three miles, has been laid since 1907.

Seek Improved Highways to Carry Farm Products

Erie, Pa.—To obtain improved highways for the transportation of farm produce to the city markets from the extensive agricultural region not touched by trolley or railroad in the east central part of the county without delay, two of the county commissioners, Grant J. Smith and Joseph F. Rogan, met in conference with State Highway Commissioner E. M. Bigelow in Pittsburgh. County Commissioner T. W. Waterhouse said: "The new highway will mean thousands of dollars to the farmers as well as to the city people. The roads along the lake shore will be completed next summer, we hope, the last being the portion of road now under construction in the western end. To the southwest, the farmers have the Erie and Pittsburgh and Bessemer railroads. Further east is the trolley line to Edinboro and Meadville. Then there is quite a stretch before the Philadelphia and Erie Railroad is reached, and from that highway of transportation to the lake shore east is the greatest stretch. Miles and miles of farmland with roads that should be the most profitable in the county are hardly fit for travel from early fall to late in the spring. No wonder the prices of farm products are high and the farmers are discouraged in some sections. To give the farmers the advantage of a quick road to the city would be helping the city people as much as themselves. At present, they have to bring their produce to the city markets when the roads are good, and then they do not know when they can get another opportunity, for the weather changes make the roads impassable for loads in a short time."

SEWERAGE AND SANITATION**Banner Year for Work on Sewerage**

Baltimore, Md.—The work accomplished by the Sewerage Commission during 1911, as contained in the report Chief Engineer Calvin W. Hendrick submitted to the commission, shows the year just past to have been a banner one in the history of Baltimore. During the year, Mr. Hendrick states in his report, the first dwelling was connected with the new sewerage system, thereby placing in actual operation the disposal plant at Back river; the sewerage pumping station was completed and put into operation and the installation of storm-water drains relieved flooded conditions in various parts of the city. The reinforced concrete conduits that will enclose Jones' Falls were placed under contract from a point about 20 feet south of Baltimore street to Union Station. To date, the report states, \$10,515,032.82 has been expended on the new sewerage work, and 230 miles of sewers and storm-water drains have been contracted for. During the present year the commission expects to spend \$4,596,881 on the work.

To Examine Water Twice Each Month

Montgomery, Ala.—Commissioner Walter R. Brassell, head of the department of sanitation and health, has issued an order to the city bacteriologist for the analysis twice every month of separate specimens of water from every reservoir in the city. In giving out this order, Commissioner Brassell explained that he deemed this course expedient in order to avoid any repetition of a typhoid fever epidemic in the city. Heretofore the city bacteriologist has been making an analysis of the water from the hydrant in the city laboratory once every month, which was considered sufficient to safeguard the consumers of the municipal drinking water. Commissioner Brassell declares that hereafter upon the slightest inclination of any contamination in any of the reservoirs or wells of the city, that reservoir will be immediately cut off from the general supply, in order that the health of the residents of Montgomery may be absolutely safeguarded in so far as the drinking water is concerned.

Analysis Discloses Sewage in Water Supply

Mount Holly, N. J.—The latest report received about Mount Holly's public water supply, an investigation of which is being made as a result of an outbreak of typhoid fever, shows that samples taken on February 7 for analysis showed sewage bacteria in both the filtered and raw water in the same percentage. The State Board also says that the water is not fit to drink without being boiled and states that some changes that will be beneficial in the operation of the filtration plant and pumping station are contemplated.

Epidemic of Typhoid Thought Due to Water Supply

Coatesville, Pa.—The alarming spread of typhoid fever in Coatesville, which developed during the past week, and has resulted in the State Health Department assuming charge of conditions in order to prevent a further spread, has caused to be made public correspondence between State Health Commissioner Dixon and the president and members of Coatesville Council. It is shown that as far back as August 1 the State Health Commissioner called attention to the Coatesville water supply, saying that it should receive immediate and careful consideration. Dr. Dixon then informed the Coatesville officials that "the danger of an epidemic of water-borne disease, notably typhoid fever, is very grave," and warned them of the importance of taking immediate steps to protect the water supply.

Expect to Commence Sewer Work in April

Newark, N. J.—Unless the unexpected happens, the construction work on the Passaic Valley intercepting sewer will be started early next April. That that is the present plan and hope of the Sewerage Commission was indicated by Commissioner Child at an informal conference that he and Commissioner Ackerman held with Mayor McBride and Finance Commissioners Berdan and Barner, of Paterson. In the course of the conference the question as to when the commission expected to begin the work of digging was brought up by the Paterson delegation.

Women's Civic League Wants Bread Wrapped

Louisville, Ky.—Unwrapped bread will not be purchased in the future by members of the Women's Civic League of Parkland. A committee composed of Mrs. George R. Yancey, Mrs. Charles Gwin and Mrs. H. L. Stahl has been appointed to ask all grocers to wrap their bread before it leaves the bakeries, so that it will be protected from dust, germs and flies. The Parkland women will call to the attention of other organizations the importance of enlisting in the campaign for clean bread. The action on unwrapped bread followed an address by Mrs. George W. Grant on "Pure Food."

Suggests Army Plan for Keeping City Clean

Dallas, Tex.—A suggestion for civic cleanliness of the highest order has been made by Dr. Scurry L. Terrell to City Finance Commissioner W. T. Henderson, his idea being to follow the lines laid down by the sanitary department of the United States Army. Dr. Terrell's idea is to make use of the city prisoners and the teams belonging to the city, thus cutting off the bulk of the expense usually incurred in a thorough cleaning of a town. According to the views presented to Commissioner Henderson, the theory of the United States Army sanitary department is that all garbage, rubbish and filth should be burned. In maneuver camps of the army each company kitchen has a garbage pit, made by excavating a hole two by four feet in size and two feet deep, lining it with loose rock, brick or some permanent lining, and in this pit burning all refuse. It has been found that no stench arises from such burning and that the solids are cremated and the liquids, poured around the edges, are evaporated. Last year at San Antonio 20,000 troops for several months lived within a constricted space and had practically no illness and no flies or smell from the regulation garbage pits used by all the troops. Dr. Terrell's idea is that this principle of successful sanitation, both from a standpoint of economy and effectiveness, be applied to Dallas, certain modifications making it applicable to use in a large and crowded city. His idea is that the entire city be thoroughly cleaned as with a fine-toothed comb as a proper basis for later sanitary work. He would leave no corner untouched, but clean every square inch of property within the corporate limits. Starting with a thoroughly clean city, his idea is to provide each block with an adequate number of garbage pits into which would be deposited all refuse from that block, an ordinance if necessary being drawn to make this compulsory, carrying out the military idea of discipline for the good of the main body. These pits would be burned out daily by a squad of men, thus doing away with the possibility of flies hatching and of disease germs being scattered. The excavation of such pits would be a matter of trifling expense; their care could rest upon city prisoners.

WATER SUPPLY**Pumping Station Christened**

Sherman, Tex.—The Fairview pumping station machinery has been set in operation following a christening by Mayor Wall, witnessed by fifty persons. The new station will take care of the output of four wells and will force 50,000 gallons of water into the mains each hour.

Forty-eight-Inch Main Breaks

Louisville, Ky.—A break in the 48-inch water main of the Louisville Water Company at Brook and Oak streets one morning last week left the whole southeastern part of the city without water for any purpose whatever. All of the street cars of the Brook street line of the Louisville Railway Company were tied up by the water, which ran curb deep from the break to the sewer ports for a block each way. The entire engineering and emergency labor staff of the water company were set to work to repair the broken main. Diversion through other mains partially relieved the situation and the pumping department of the water company said that at no time was any section of the city entirely without water and that complaints of lack of pressure were few. A piece of the 48-inch main at Brook and Oak streets, about 3 x 4 feet, was torn bodily out of the top of the main, and the surface of Brook street for 50 feet and extending laterally almost from curb to curb was washed out.

Electricity Opens Hydrants

Hackettstown, N. J.—More than half of the fire hydrants of the town were frozen during the severe cold weather and former Councilman Charles P. Hankinson, chief electrician of the Electric Light Company, began the work of thawing them out by electric current. There were no fires during the past weeks, or the destruction to property might have been severe.

Electricity Thaws Pipes

New Britain, Conn.—One of the novel uses of electricity was illustrated on Francis street, when the ice in a water pipe, frozen for over 130 feet, had to give way under the influence of the hot current. The pipe ran down Francis street to a house owned by E. O. Kilbourne, and had been frozen for several weeks. When the ingenuity of the plumbers seemed to be exhausted A. K. Barr, of Blake court, suggested that electricity be used to thaw the pipe. Mr. Kilbourne appealed to the local office of the Electric Light & Water Company for assistance. One of the company's transformers was placed in a wagon and hauled over to Francis street. One end of a wire was connected to the water faucet in the house and then in a series with the transformer. Using a barrel of water for the resistance, the other end was connected to the primary 2,000-volt circuit. The whole length of the pipe was thawed out in just seven and one-half minutes.

Records Made in Water Works Management

Topeka, Kan.—In his annual report to the city commissioners, Jesse Shaw, superintendent of the city water works, shows that for the first time in the history of the city Topeka was not forced in the year 1911 to rely upon the river for a water supply in emergencies. Not once in the twelve months of 1911 was it necessary for the water works to go to the river for water. Every gallon of water was pumped from the drive wells under the river and from the immense wells on the river front west of the city. In past years it has been necessary in a dry season or in icy weather on the river to pump water through the river intake valves and pollute the city's water mains. In the year 1911 the city water works department made the best record for water pumping per ton of coal in its history. For every ton of coal used at the pumping station 372,360 gallons of water was forced through the mains to the city. For every pound of coal consumed 186 gallons of water were sent to the city consumers. Last year—a record year at that time—only 160 gallons of water was pumped per pound of coal. And this year the city furnished steam to run a huge sand dip. The record of water pumped in 1911 runs above the billion gallon mark. This is the highest number of gallons of water consumed in the history of the city—and the water used at fires was in a small amount compared with many years. The water works pumped a daily average of 3,067,713 gallons of water a day and a monthly average of 93,309,616 gallons.

Water for Half a State

Trenton, N. J.—A great scheme of water conservation to solve the water problems of all of New Jersey south of the Raritan river is unfolded in a report submitted to Governor Wilson by the State Water Supply Commission, which recommends the immediate purchase of 110,000 acres of land at a cost of about \$1,000,000. This land forms the head waters of the Mullica river, and in addition the report advises the acquisition of additional tracts aggregating 100,000 acres, which would cost something less than \$1,000,000. The commission figures that with these purchases the water difficulties of Trenton, Atlantic City and Camden, which cities soon will be confronted with serious problems, would disappear. According to the plans there would be a collecting reservoir at Batsto, at the forks of Mullica river, which stream alone, the report says, is capable of supplying all of the water that the cities of the State, south of the Raritan river, may need for many generations. Storage reservoirs at the highest level, 70 feet above tidewater, including some small reservoirs on the head waters of Rancocas creek, could be constructed with a capacity of more than 25,000,000,000 gallons, and storage reservoirs for the same waters at lower levels could be constructed with a capacity of more than 18,000,000,000 gallons. A distributing reservoir could be built on Cooper river at 61 feet elevation capable of holding 2,000,000,000 gallons.

Collinsville Water System Completed

Collinsville, Tex.—The new water works system for Collinsville has been completed and is now ready for use. The system comprises a deep well, gasoline engine and a reservoir that will hold 300 or 400 barrels of water.

Frozen Pipes Arouse Citizens

Hackensack, N. J.—The action of the Public Service Corporation in charging \$15 to thaw out frozen water pipes in Hackensack (double the price that has been charged heretofore) has produced a movement which, under the leadership of William A. Linn, president of the People's National Bank, will probably lead to a reduction of the alleged excessive charges. Mr. Linn has called on all citizens who have had to pay the increased charges for thawing out pipes to send their names to him and enlist in the crusade against what are regarded as exorbitant terms. The Public Service Corporation is said to have been reaping a rich harvest during the cold spell, but the probability is that the pressure of the aroused citizens will lead to a refunding of part of the money paid.

Borough's Water Plant Earns \$3,729

Somerset, Pa.—Somerset borough's finances are in a healthy condition, according to the report of Auditors William H. Welfley, H. Frank Yost and Robert H. Hoffman, who have just completed their investigation of the receipts and expenditures of the municipality during the ten months ending December 31, 1911. That municipal ownership of the water works is an excellent investment is amply proved by the auditor's report, inasmuch as the gross receipts for the ten months were \$6,083.50, while the operating expenses for the same period aggregated only \$2,354.03, leaving a balance of \$3,729.43. In other words, the water plant, which cost the municipality about \$50,000, has an earning capacity of about \$7,000 per year, or more than 3 per cent. interest on \$200,000. Since its installation about 17 years ago the water works has never failed to earn a net annual profit and each year shows a gratifying increase.

STREET LIGHTING AND POWER

Decorative Lighting Planned for Pueblo's Streets

Pueblo, Col.—Plans for the decorative lighting of North Main street from the new traction building, opposite the Central block, to Seventh street, have been formulated by T. A. Duke, Commissioner of Parks and Lighting. The new lighting district is the first of a series of four which will result in a beautiful and uniform system of lighting for the entire business section of the city. It is proposed to take up each section separately toward the end that Pueblo's lighting system shall compare favorably with the most advanced ideas that the modern cities of both Europe and America afford, not only from the standpoint of effect, but also from that of economical municipal illumination. Decorative poles bearing clusters of five high-powered tungsten lights and four small colored drops is the plan which Mr. Duke will recommend to the property owners.

Believes Municipal Heating Plants Feasible

Cleveland, O.—A series of central heating stations, supplying steam heat to the residents of Cleveland, is the municipal enterprise that should follow the successful operation of the big municipal lighting station soon to be erected on the lake front, adjoining the Kirtland pumping station, in the opinion of F. W. Ballard, constructing engineer. Ballard is opposed to the plan of combining the heating business with the light and power business. In his opinion, the heating plant should be operated entirely apart and the city should take it up as a separate proposition in the future if the lighting plant demonstrates that the city successfully can operate institutions of this character. Engineer Ballard said in a recent interview: "The matter of municipal heating plants should be taken up in the future. In time, all the cities will come to the central heating station idea. I believe that Cleveland, with its new municipal lighting plant, will point out the way for the development of these municipal activities. Cities all over the country are watching Cleveland."

Improved Lighting System for Main Street

Louisville, Ky.—Main street, between Fourth and Fifth streets, will become a little White Way. Announcement has been made by George G. Fetter, of the George G. Fetter Heating and Lighting Company, that contracts have been closed with wholesale houses in this district for the installation of modern standard lights similar to those installed some time ago on Market, between First and Seventh streets, and on Jefferson, between Second and Fourth streets. The work of installing the standards will be started about March 1, Mr. Fetter states, and he expects to have the lights burning by March 15. Mr. Fetter's big wholesale establishment is located in this block, and it is understood that he has arranged to furnish the lights to other business men in the block practically at cost. They will be about fifty-five feet apart.

Cost of Municipal Street Lights

Topeka, Kan.—According to a report just compiled by George O'Neill, superintendent of the city electric light plant, it cost the taxpayers of Topeka \$34.63 a lamp to keep the street lights in operation for the year 1911. Add to this the 4½ per cent. interest and the 5 per cent. depreciation, it costs \$47.72 a year per lamp. This is nearly half the amount that would be charged the city by a private concern. The operation of the municipal plant for the year 1911 was a success from the city's point of view. It was the best year in the history of the plant. In the same year the city installed 25 new arc lamps and 17 tungsten lights. Add to the 416 arcs and 39 tungstens in service, the city has a total of 441 arc and 56 tungsten lights on the streets. The operating expenses of the plant for the year amounted to \$15,584.11. Of this amount \$4,222.49 went for fuel and \$6,241.34 for wages and salaries. The rest for miscellaneous expenses.

Municipal Plants Make Good Showing

Clay Center, Kan.—Can municipalities operate water works plants, electric light plants and other public utilities with more advantage to the general public than private companies? Clay Center has answered the question to the satisfaction of part of the citizens of this town who believe that towns and cities should own and operate their water works plants and electric lighting systems, if not all their public utilities. In the summer of 1906 Clay Center waged a fierce campaign over the question of building a city electric lighting plant. Finally bonds to the amount of \$20,000 were voted to install an electric lighting plant. As soon as the private plant went out of business and all the trade came over to the city plant, the municipal concern began to build up a surplus. All improvements, extensions, etc., were paid for out of the earned surplus of the municipal concern. This winter at the interest paying time \$5,000 of the bond issue of \$25,000 was paid. Thus in a little over a year, during which time the city has enjoyed all the electricity business in Clay Center, \$20,000 has been cleared by the municipal plant, of which sum \$15,000 was spent in improvements and extensions and \$5,000 to retire bonds. Part of this money was no doubt earned by the water works end of the public utilities and part earned before the city obtained all the electricity business of the town, though it is claimed that \$10,000 of it, or half, was earned by the electric light plant during the year in which the city had the monopoly.

Schenectady to Install New Lights

Schenectady, N. Y.—Schenectady in the near future will be the most magnificently lighted city in the world, the Real Electric City, for the General Electric Company is now manufacturing lights which will replace every one now in use here and which will add 100 per cent. to the illumination of the streets. This big order for the new lights was placed with the General Electric Company last September. Parts of the new lamps are being made in this city and parts in Lynn, Mass. The new lights which the Illuminating Company has ordered are known as Magnetite Luminous arcs. The 900 lamps to be installed will cost \$60,000. They give double the intensity of the flaming arc now in use and the present arc lights for street illuminating. The new lights will give a white light, instead of the yellow glare of the flaming arc.

FIRE AND POLICE

New Engine Stood Test

Sea Cliff, L. I.—The new \$5,000 Nott third-class fire engine of the Sea Cliff Fire Department was tested at Aberdeen Park the other day by Representatives Hudson and Steinert, of the National Board of Fire Underwriters. Mr. Wilkinson, manager of the Nott Fire Engine Company of Minneapolis, Minn., manipulated the engine and demonstrated its efficiency. The Board of Underwriters is to make its report on the test within a few days to the village board, and it doubtless will be a highly favorable one, as all residents and firemen were impressed similarly by the demonstration.

Annual Report of Fire Chief

Shreveport, La.—Chief Chris O'Brien has filed his annual report with the Superintendent of Public Safety. According to the report, which shows an average of two fires every three days during 1911, the city had 254 alarms, with a total loss of \$70,914, on which insurance was paid amounting to \$46,717.60. The total value of the buildings burned, together with their contents, aggregated \$715,000. The department was able to handle the fires so efficiently that a loss of less than 10 per cent. occurred. The largest losses were in the outskirts of the city, where the facilities were poor for obtaining water. The city expects soon to equip the department with two motor-propelled fire engines, one combination chemical and hose motor wagon, and a motor tractor to pull the large Seagrave truck now in use.

Civil Service for Police and Firemen

Indianapolis, Ind.—Mayor Shank has announced that the police and fire departments will be placed on a strictly civil service basis, so far as the law will permit, as soon as the proper rules can be drawn and enacted into a city ordinance. The mayor has asked the city legal department to prepare an ordinance incorporating civil service rules at once. One of the demands of the fire insurance interests, in consideration of lower insurance rates, is that the fire department shall be on a civil service basis. The mayor says that he is heartily in accord with this and that he will also insist on a similar provision for the police department. Just what the civil service rules for the two departments will be the mayor does not know, but he says it is likely that all candidates for appointment to either department will have to submit to an examination before a civil service board and be placed on a waiting list in the order of their standing determined by the examination. As the law requires that the police and fire departments shall be equally divided politically, the mayor says there will be two waiting lists, one for the Democrats and the other for the Republicans. The mayor says promotions in the departments will also be governed by merit and length of service.

Director Judkins Favors High Pressure

Atlantic City, N. J.—In an interview a few days ago Section Director Judkins stated that he believed it would be worth while for Atlantic City to install a high pressure fire main. "I thoroughly agree with a recent editorial in the *Press* that Atlantic City would not be wasting time by considering the advisability of a high pressure fire main," stated the section director. "I think it would be an excellent equipment for the city. I realize that we have a splendid fire department here and too much cannot be said in praise of its efficiency and good work. But firemen are dependent on the water supply and the weather. I believe a high pressure fire main is well worth considering. The suggestion is timely."

No Fire Apparatus—Half of Village Burns

Butler, Pa.—Practically one side of the main business street of Eau Claire, a town of 400 people in this county, was wiped out by a fire. Practically every man, woman and child in the village turned out with buckets and fought valiantly to control the blaze and save the rest of the town, but although the fire was prevented from crossing the wide street, it burned practically every building on the side on which it originated. The village has no fire apparatus, and the efforts of the citizens were handicapped by the intense cold. The loss will reach \$30,000.

May Discard Horse Patrols

Washington, D. C.—Should the Commissioners succeed in obtaining an appropriation to make effective recommendations made in the annual report of Major Sylvester, each of the eleven police precincts will discard the horse patrol wagons in the near future and the chief of police also will have a motor vehicle at his command. It also is recommended that an automobile be provided for use of the members of the detective corps.

Washington Bicycle Policemen Active

Washington, D. C.—Members of the bicycle squad of the Police Department, who are primarily engaged in enforcing the traffic laws and regulations from 8 o'clock in the morning until midnight, made 6,456 arrests during the last fiscal year. Fines in the cases aggregated \$33,373. In addition to those on duty during the hours mentioned one bicycle policeman is on duty in each precinct from midnight until 8 o'clock in the morning for emergency work.

Fire Equipment Completed.

Indianapolis, Ind.—The equipment in engine house No. 12, at New Jersey and South streets, was completed when engine No. 12 was placed in service. This is one of the new engines ordered by the Board of Public Safety several months ago. A new engine was also placed in service at engine house No. 26, at Webb and Raymond streets. Engine house No. 12 and engine house No. 13, at Kentucky avenue and Maryland street, have just been completed and inspected by the Board of Public Works and Board of Public Safety. It is probable the new buildings will be formally accepted by the Board of Works next week.

Loan Old Fire Horses to Other Departments

Los Angeles, Cal.—The ten old fire horses that were to have been sold off at auction by the Fire Commission will receive a better fate. The Fire Commission have rejected all bids and turned the old horses over to other departments of the city as a loan. The Street Department will receive eight of the horses, the Health Department one and one will be retained by the Fire Department to be used in the bureau of the fire alarm. Mayor Alexander said that most of the horses are really good and have years of usefulness ahead of them, but they are not fitted for the work of the Fire Department. The Fire Commission was petitioned to pension the horses, but the Mayor said the department was rapidly getting motor apparatus to replace the horses, and in a couple of years all the horses would have to be disposed of and it was too much to expect the city to pension 200 fire horses.

City Firemen to Wear Badges

Fort Worth, Tex.—A badge has been designed by the Fire Department for the use of the firemen of the city, and when they are placed in use it will be the first time the firemen in Fort Worth have had badges. A new badge has been adopted for the Police Department also. Fire Chief Bideker adopted the Fire Department badge. This description of the badge is furnished: The open jaws of a panther placed within a five-point star occupy the center of the design, a tribute both to the city and State. The letters "Ft. W. F. D." are at the top and sides, with the number of the shield and a pair of crossed fire trumpets at the bottom." Commissioner Allen and Chief Renfro selected the police badge. A description follows: The police badge is in the shape of a shield. It is surmounted by the figure of a crouching panther and in the center is a five-point star with "Police, Fort Worth," in a circle around it and the number of the badge at the bottom. An order has been placed for 100 police shields and 12 detective shields. The star in the center of the police shield will be replaced by the word "Detective" for the detective force. The police shield will be nickel and German silver.

Houston Has Disastrous Fire

Houston, Tex.—A fire, which originated about one o'clock on the morning of February 21 in a two-story frame building adjoining the Southern Pacific Railway tracks, spread so rapidly, owing to a high wind blowing from the northwest, that before it could be controlled an area of nearly fifty blocks was burned. The total loss by fire is estimated at \$6,500,000; total insurance, \$4,500,000; total insurance to be paid, about \$3,000,000. Salvage from the burned district is counted on to reduce the actual insurance payments to near \$3,000,000. There were no fatalities, fortunately.

AUTO APPARATUS NOTES

New York Installs Its First Gasoline Pumping Engine—Some Construction Details—Newark Telegraph Department Service Auto—Some Maintenance Estimates from Bridgeport—Village Has Auto as Well as Hand Pump.

New York, N. Y.—A gasoline-propelled and operated pumping engine manufactured by the Watrous Engine Works Co., St. Paul, Minn., was put in commission last week at Engine House 39, on East 67th street, near Third avenue, adjacent to the fire department headquarters building. It is the first engine of the gasoline pumping type that has been put in regular service in New York city. The calls at this house average about 45 a month. Before being placed in service the engine was given a severe series of tests. It is rated at 700 gallons per minute capacity—the official test was 744 gallons, and the manufacturers state that it can pump 800 gallons. One test consisted in forcing a stream through 1,000 feet of hose, including a rise of 85 feet, and under these circumstances it threw an effective stream of 279 gallons per minute. As to power and speed, the engine is 126 horsepower, A. L. A. M. rating. This gives a rated speed of 35 miles an hour, though it may be driven faster.

Some of the details of construction are as follows: Frame, channel steel. Six-cylinder engine, $7\frac{1}{4}$ inch diameter by 8-inch stroke. Compressed air starter. Three independent systems of ignition. Weight, 13,700 pounds. Wheel base, 144 inches. Tread, 62 inches. Tires, 42 by 5 front; 42 by $3\frac{1}{2}$, dual, rear. Springs, semi-elliptic in front; full platform in rear. Gasoline tank, 40 gallons capacity. Selective type transmission; three speeds forward, one reverse. Double chain drive.

The pump consists of four cylinders, $4\frac{3}{4}$ bore by 8-inch stroke, placed in pairs at an angle of 45 degrees. The suction is in the rear of the wagon on both sides. The discharge gates are also on each side on the rear. There are two automatic relief gates and a hand relief on the discharge pipe. The method of transmitting power from the gasoline engine to the pump is briefly as follows: A main shaft extends back under the wagon body, which carries the pump. This is geared onto an auxiliary shaft by gears, reducing the speed one-half. When the engine runs at 600 the auxiliary shaft runs at 300. This shaft extended is the crank shaft of the pump. The cranks revolve in a case filled with oil—the splash system. The positions of the pistons of the pump, as well as the pistons of the engine, are such as to equalize the load, the result being, the manufacturers state, that there is very little vibration even when the pump is working hard.

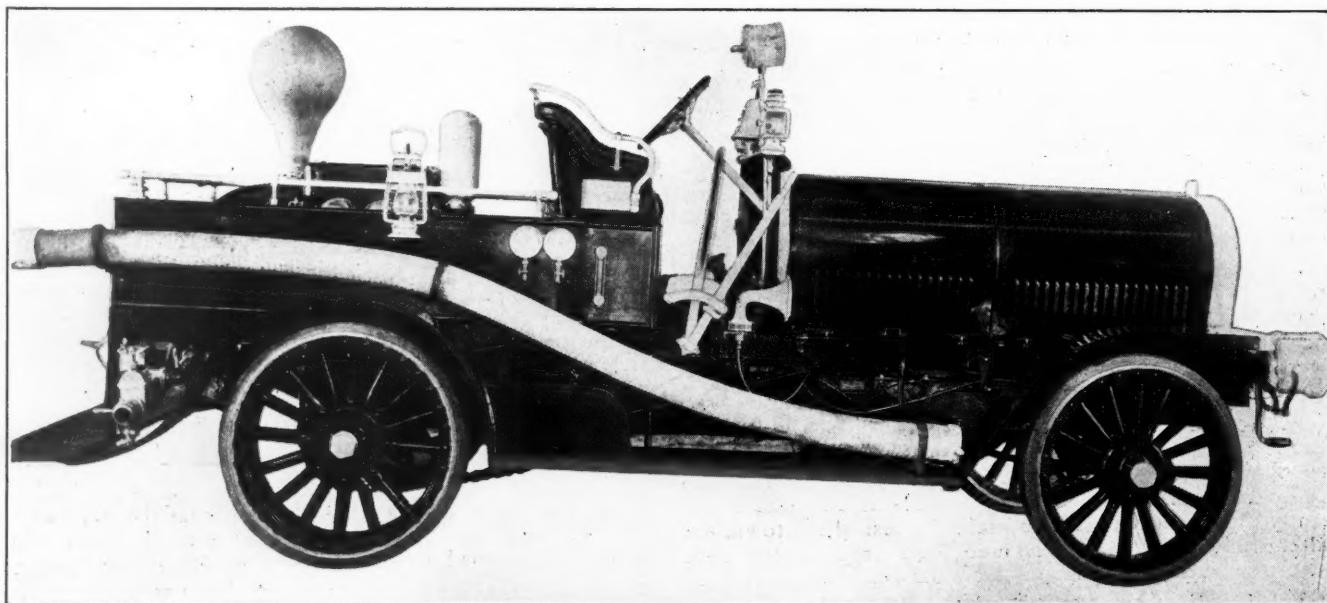
South Bend, Ind.—Mayor Charles L. Goetz, Chief Wilfred Grant, of the fire department, and members of the Board of Safety, attended the automobile truck show held in Chicago recently, which they visited for the purpose of inspecting motor fire apparatus. The new motor chemical is now on duty, and Irving Sibrel, captain of the chemical company, and Louis Lederer, driver of truck No. 1, made a trip to Kenosha, Wis., where they received points on handling and running the new motor chemical.

Newark, N. J.—The fire alarm telegraph department of the Fire Department has had in commission for over six months two motor cars which were built in the repair shops on Thomas 1907 chassis which were purchased second-hand. One car carries a simple express body and is used for carrying heavy materials and for general serv-



TELEGRAPH DEPARTMENT SERVICE AUTO.

ice. The other car shown in the illustration has a special function. It is held ready to respond at any day or night to a request from headquarters to investigate and repair any line in which trouble is found. Besides this it responds to all second alarms in order to cut wires that may interfere with the work of the firemen, as well as to take care of the department's own wires. The wagon carries an ample supply of linemen's equipment, besides cables of various sizes, so that any ordinary repair can be made without sending back to the shop. Two long tool boxes extend along the sides of the wagon, so that they are available as seats as well as chests. Experience has proved this to be a very practical and valuable piece of apparatus and its cost was not great. It is stationed at the fire department's repair shops on Pleasant street, where it was built, not far from the center of the city. The repair shop, by the way, is a valuable adjunct of the fire department, and is equipped for doing a large variety of work.



WATROU'S GASOLINE PROPELLED AND OPERATED PUMPING ENGINE INSTALLED AT COMPANY 39, NEW YORK CITY.

New York, N. Y.—Five horses, which have for years been the pride of the members of Engine Company 39, at Fire Headquarters, in East Sixty-seventh street, and to which all of the headquarters officials have become attached, will leave next week, never to return. They are cast aside to make way for gasoline-propelled fire-fighting machines. Malden, Charion, Tom, Enright and Anterash, five of the finest specimens of the department, will be honored when they leave by members of the company, officials and chiefs. Chief Kenlon has ordered that the animals be decorated with white ribbon and that they be given a good send-off. The machine which takes the place of the old fire engine is "The Giant," the first of the gasoline pumping engines to be given an actual service test. The tender is also gasoline propelled.

Scotia, N. Y.—Scotia has a model fire department, which has been favorably commented on by officials from other villages who have been sent here to secure data on the fire system. The department is housed in the modern village hall, at Mohawk avenue and Ten Broeck street. At the present time it consists of one combination wagon, hook



SCOTIA'S FIRE HOUSE AND EQUIPMENT.

and ladder truck and auto hose wagon, supplemented by five hand hose carts and the old Neptune No. 1 hand pump, which has not been in use since the installation of the present water system, but which is held in reserve. The department is headed by Chief A. C. Spitzer, with Llewellyn Ford as assistant chief. Spitzer is known as the "Scotia Yates" because of his services to the department, which has been his hobby for years. The department has one paid man, who acts as driver of the combination wagon, which is drawn by two big black horses. The hose company is known as the Neptune No. 1. The auto wagon carries chemicals and hose and is used as the chief's car.

New Britain, Conn.—Arguments in favor of motor vehicles for fire departments are being presented to the members of the Board of Finance and Taxation and the members of the Common Council by the commissioners of public safety in communications to each of the above-mentioned municipal bodies. The safety commissioners will ask for an appropriation for a combination chemical and hose motor wagon in the estimates for the fiscal year of 1912-13. It is believed the purchase of a piece of motor driven apparatus will result in saving in the annual maintenance account of the department. In the opinion of the board a triple combination motor—a pumping engine, chemical and hose motor—would render the best service to the city, but the first cost, \$11,000, would probably be more than would be possible at this time. The chemical and hose motor, however, will well demonstrate the value of the motor-driven equipment. The possible economy in maintenance in the local department is estimated as follows: Captain, present cost, \$925; with auto, \$925. Lieutenant, present cost, 900; with auto, \$900. Engineer, present cost, \$300; with auto, none. Stoker, present cost, \$250; with auto, none. Driver, present cost, \$900; with auto, \$900. Hoseman, present cost, \$900; with auto, \$900. Six callmen, present cost, \$1,200; with auto, \$1,200. Two substitutes, present cost, \$200; with auto, \$200. Upkeep of horses, present cost, \$400; with auto, none. Upkeep of auto, \$180; wear on apparatus, present cost, \$25; with auto, none. Total present cost, \$6,000; total with auto, \$5,205; saving, \$795. The driver of the auto would be an addition to the fire-fighting force in an auto company and the salary could be added to the amount saved, making a total of \$1,695.

Altoona, Pa.—The steadily increasing cost of the maintenance of Altoona's Fire Department, which has almost quadrupled since the department was created about seventeen years ago, and the scant municipal revenues, which make it almost impossible for Councils to bring the expenditures within the municipal revenues, has led a number of the members of Councils to seriously consider plans whereby the cost of maintaining the department may be greatly reduced without impairing in any way its efficiency. A number of plans have been considered, but perhaps the one that is attracting the most attention is that evolved by Common Councilman Charles H. Cassidy of the Twelfth Ward. Mr. Cassidy's plan is a comprehensive one, and he claims its adoption will save the city \$15,000 this year if it can be carried out. He proposes to do away with all the horses in the department, substituting motor power for the animals. To accomplish this it will be necessary to sell all the hose wagons now in service, buying motor trucks in their place, and fitting up the engines now in service with motors with which to haul them. The sale of the horses and hose wagons and the saving on horse feed would partially pay for the new equipment it would be necessary to purchase. In addition to the saving that could thus be effected, it is claimed that better service could be secured, as alarms could be responded to much quicker with motor-driven apparatus.

GOVERNMENT AND FINANCE

City Treasurer Asks for Automobile Pay Car

Detroit, Mich.—City Treasurer Koch has asked for \$1,500 for an automobile pay car, for the double purpose of doing away with the invasion of the City Hall every Wednesday afternoon by an army of day laborers, and of avoiding a repetition of the occurrence of a few weeks ago when Officer Timothy Moynihan was slugged and robbed while taking the pay of the garbage wagon drivers out to the receiving station on Twenty-fourth street. Koch's plan is to pay on the east side of the city one day and on the west side the next day, and by notifying the foremen have the men gather at central locations to meet the car at stated times. He would have the car accompanied by the paymaster and two police officers, one to drive and one to watch the money, and he believes that this system would put an end to any possibility of padding the pay rolls. The crowd of laborers after their pay Wednesday afternoons has become a veritable nuisance in the City Hall. They form in long lines which sometimes reach from the ground floor entrance all the way up the stairs to the treasurer's office, and it is often almost impossible for women and others to get into the offices on the second floor to transact regular business.

Four More Cities Now First Class

Denver, Col.—Four second-class cities were admitted as first-class cities at a meeting of the Governor, State Auditor and Secretary of State, who constitute the board required by law. The cities are Lamar, Glenwood Springs, Monte Vista and Alamosa. The law provides that cities of more than 2,000 population may be admitted as cities of the first class. The last census made six second-class cities eligible, but Walsenburg and Silverton asked the board to take no action until April, when the regular elections are held. These two towns declared they do not wish to go to the expense of a special election at present.

Will Study Municipal Codes of Other Cities

South Bend, Ind.—A regular course of study in the municipal codes of various cities has been planned by the city committee of the Chamber of Commerce at its last meeting. The committee as a whole will first take up the Indiana cities and towns act, which the government of South Bend is carried on. Subcommittees will investigate the codes of other cities and report on them. The reports will be taken up and discussed. By the time the Legislature convenes, when it is probable there will be a flood of bills touching upon municipal government plans, the committee will be well informed on all the forms now before the public. As a side line the committee will endeavor to see if some way cannot be found to make the prisoners in the county jail do some work in return for their board and housing while serving out sentences.

STREET CLEANING AND REFUSE DISPOSAL

Sanitary Garbage Cans Offered Free to City

Montgomery, Ala.—A representative of an advertising company has appeared before the city commission and offered to present the city with a large number of sanitary garbage cans if the board would agree to allow a certain amount of foreign advertising on the cans. The matter will be taken up later by the commission. The can is about three feet high and is arranged so garbage can be removed from the bottom, thus obviating the necessity of turning the can over before trash can be removed. It is proposed to place only foreign advertising on the receptacles. This same company appeared before the commission several months ago, but the plan was rejected as the company desired to place local advertising on the cans. This would cause bad feeling among those who could not secure the privilege.

Eighty-five Miles of Streets Washed

Tacoma, Wash.—Nearly eighty-five miles of paved streets were washed and swept by the Department of Public Works in January, according to the monthly report of Commissioner Owen Woods. The brick, stone and asphalt pavement covered by the horse sweepers was 59.78 miles in extent, while the pavement washed was 24.83 miles. Cart men covered 335.79 miles. Contracts accepted and completed in January amounted to \$96,278, while two contracts awarded totaled \$4,422. Contracts under way Feb. 1, however, amount to \$718,648.95, including the vertical lift bridge contracts. Departmental expenditures totaled \$35,286.66. Of this amount \$16,004.60 represented sums expended in the commissioner's office, the city engineer's office, the City Hall, on bridges, and labor and repairs, of \$10,327.43 made in the Street Department. The balance was expended on the municipal dock, Tacoma avenue bridge, fire stations, on the Pacific avenue storm sewer, etc. Receipts of the department amounted to \$2,083.51, from rentals, advertising and for engineering and inspection.

RAPID TRANSIT

Will Pay Nearly \$100,000 for Entry to City

Sacramento, Cal.—Upon the payment of a sum close to \$100,000, the Oakland, Antioch and Eastern Railway, which is to construct an electric line between here and Oakland, will be permitted to enter the city via the M street bridge, according to an agreement reached at a conference between officials of the Vallejo and Northern, Northern Electric, the Supervisors and the District Attorney. The conference was held for the purpose of determining the pro rata of the Oakland line. The bridge will cost \$390,000, of which \$160,000 was to have been paid by Sacramento and Yolo Counties. The arrival of the Oakland line to share the cost will mean a reduction of the counties' proportion as well as the other railroads. The Oakland line also agreed to share the cost of maintenance and patrol. Sacramento County had agreed to contribute \$2,000 a year toward the maintenance, but this amount will be reduced. The Oakland line has applied for a franchise to cross the M street bridge and the application will be acted upon by the Supervisors.

City Favors Reorganization of Trolley System

Santa Barbara, Cal.—At a meeting of 175 representative men of the city, held at the Chamber of Commerce, the plan proposed by George I. Cochran of Los Angeles and George A. Batchelder of Menlo Park, to reconstruct the system of the Santa Barbara street railway was enthusiastically endorsed. A resolution was adopted calling on the City Council to grant the company a 45-year franchise, with a clause allowing the city to purchase the system at the end of forty-five years, and the property, with the exception of the plant and rolling stock, to revert to the city when the franchise expires. The estimated cost of the rebuilding is \$250,000, but \$500,000 bonds will be issued in order to allow a good margin for future extensions. Only one man, Judge B. F. Thomas, spoke in opposition to the project, claiming that the city should not grant a long-time franchise, and that there will be sufficient power when the new water tunnel is completed to operate the cars and light the city. The Council will take the matter up at their next meeting, and is expected to grant the franchise.

MISCELLANEOUS

Will Build Free Municipal Plunge

Stockton, Cal.—The town of Oakdale, twenty miles east of this city, has just decided on a novel innovation in the shape of a municipal swimming tank. It will be the first of its kind in the San Joaquin Valley and will be free to all. When the proposition was first mentioned the residents considered it a joke, but the City Trustees have evidenced their sincerity by purchasing three lots in the western part of the town and announcing that they will in the near future call for bids for the construction of the tank.

Drinking Fountains to Be Placed Soon

Bridgeport, Conn.—As soon as possible the new drinking fountains which have been ordered by the Board of Education will be placed in the public schools of the city for the use of the pupils and another week should see them installed. Since the law prohibiting the common drinking cup from being used in Connecticut on account of the ravages of the "great white plague" none have been used in the public schools. The new fountains, of which there are forty-eight, are composed of five jets combining into one, a turn of a small lever allowing the water to flow. In this manner the lips of the person drinking touch nothing but the stream of water and all danger of carrying tuberculosis germs is eliminated. The price of the new fountains is approximately \$6, so that the innovation is not an expensive one but an exceedingly healthy one. Two will be placed in each school.

Plan Map to Advertise City's Advantages

St. Paul, Minn.—A relief map of St. Paul, to be made on the same scale and at the same time a similar map of Minneapolis is made, will be authorized if the Common Council adopts the recommendation of the Aldermanic Streets Committee favoring it. The project is that of the St. Paul Association of Commerce, will cost approximately \$600, and when finished the map will be used for publicity purposes in exhibitions at different conventions. Val J. Rothschild represented the association when the project was brought up for consideration. He said it was proposed to make a map showing all the streets, boulevards and parks within the city, and also the principal buildings. It carried the Mayor's recommendation. The map is to be made at the next meeting under the supervision of City Engineer Claussen, and the maps of the two cities will show them in their correct relation.

European Trip Suggests Ideas for Beautifying Syracuse

Syracuse, N. Y.—Impressed with the possibilities of city planning as carried out in London, Paris and Brussels, Frederick R. Hazard, president of the Solvay Process Company, and H. H. S. Handy, executive vice-president of the Semet-Solvay Company, have returned from a business trip to Europe. Mr. Handy, who is also president of the Chamber of Commerce, said that, in viewing the new boulevards laid out in the three European cities since his last visit, he had seen a number of features that would be used in beautifying Syracuse. In London he visited the new boulevard that connects the Strand and Oxford street.

When the City Council of London decided to build this boulevard, all property adjacent was purchased at an enormous expense. After the construction of the thoroughfare, Mr. Handy said, the engineers laid out building lots on each side and leased the ground to individuals or corporations who would build modern structures. Theaters, hotels, business blocks and many other fine buildings, he declared, had been constructed, so that this section of the city, heretofore congested, had been converted into a beautiful locality. He stated that the council would derive from the ground revenue in rentals far in excess of the original cost of the boulevard, besides accomplishing a wonderful improvement. In Brussels, Mr. Handy found many of the older sections of the city entirely changed by this city planning policy, while on the left bank of the Seine, he saw more wonderful improvements along the same lines.

One of the things that made these cities so attractive, according to Mr. Handy, was the care in selecting striking locations for imposing buildings. He thought similar care in choosing sites for new buildings with a view to city improvement, would help to make Syracuse more attractive.

Would Have Ordinance for Uniform House Line

Omaha, Neb.—Tom Flynn, Street Commissioner, wants a new city ordinance. "It will help to beautify the city," he says, "and it will do away with a lot of squabbling between neighbors and abutting property owners. Mr. Flynn suggests an ordinance that will prevent a lot owner from constructing a house beyond the line of the majority of houses constructed on that block. 'Fix a building limit,' is what he wants. "Pass a law requiring the owner of a lot to conform to the will of the majority. I know several cases where houses have been built 15 to 18 feet out from the building line, obstructing neighbors' views and inconveniencing them."

Cash Prizes Offered for Beautifying Homes

Pennington, N. J.—Civic pride in the pretty suburb of Pennington has caused the organization of a Board of Trade, which is composed of seven departments: Local Improvement, Membership, Publicity, Grievance, House, Legislation and Law and Entertainment committees. The officers of the Board of Trade are: Elmer D. Wagner, president; Dr. Edgar Hart, vice-president; George W. Scarborough, secretary; Henry L. Lanning, treasurer. The members of the board have announced an offer of \$400 in prizes for the ornamentation of the borough. These cash prizes are to be divided into two classes. One fund of \$300 is to be distributed each year among the residents who make the most meritorious improvements to their homes, walks, grounds, drives and premises generally. This fund of \$300 will be distributed on September 1 of each year as follows: First prize, \$50; second, \$25; third, \$10; fourth, \$5; fifth, sixth, seventh, eighth, ninth and tenth prizes, \$2 each. The improvements to be considered in the awards of these prizes will include the following: Painting, repairing, planting of trees and flowers, etc., grading, laying walks and curbs, making grass swards and the general cleanliness of the property. The prizes will not be awarded with regard to the value of the properties involved, which fact will enable the owner of the most humble house to stand an equal chance with the person who occupies the most elaborate home in the borough. The other fund of \$100 will be distributed in prizes totaling \$10 every two weeks. This cash will be presented to residents of Pennington who make the most valuable suggestions for the improvement and advancement of the borough. The first prize in each instance will be \$5, the second \$3 and the third \$2. The creation of this fund furnishes another example of the aggressiveness of the new Board of Trade in Pennington. Organized last fall, the board started out with the idea of securing 100 members. The residents of the borough took so kindly to the idea that already the board's membership has reached 103, with fresh applications being received every week. When one considers that the population of Pennington, according to the last census, was only 702, the numerical strength of the Board of Trade is little short of remarkable. The purpose of creating this Board of Trade was to not only make Pennington prettier and more cleanly, but also to urge better and cheaper railroad and trolley accommodations, the abolition of grade crossings, etc.

Expect to Maintain a Municipal Garage

Los Angeles, Cal.—Los Angeles is to have a municipal garage and repair shop, if the Finance Committee can find the money for that purpose. As the municipal garage is one of Whiffen's pet projects and Whiffen is chairman of the Finance Committee, there seems to be a good prospect that the money will be forthcoming. Acting on the suggestion of Whiffen, the Council has instructed the city store-keeper to determine the cost of repairs to the many city automobiles, and also instructed the Building Committee to find out how much it will cost to build and equip a proper garage. Every department of the city is rapidly discarding its horses and purchasing motor trucks instead. Mayor Alexander said that it would be but a year or two until every piece of fire apparatus the city owns will be motor driven instead of horse-drawn. Other departments are also using motor trucks. The latest to do so is the Garbage Department, which is now using motor trucks in the collection of garbage in the hotel district.

Mayor Suggests a Municipal Home

Spokane, Wash.—That the city undertake a comprehensive plan for the relief of the needy, including probably a municipal home for workingmen, has been proposed in the City Council by Mayor Hindley and endorsed by Commissioner Coates. The Mayor announced that he would enter into conference on the project with the Charities Commission in the near future. The problem he proposes to undertake is not only the care of unemployed men but provisions for all needy sick, infirm, hungry and unemployed, the city to assume full responsibility, supplanting private charities. The Mayor mentioned the possibility of a municipal lodging house and workhouse. A home similar to the Christian home, managed by Warren Latham, only on a larger scale, is suggested. A special tax levy for support of the institution would be made. The Mayor mentioned that it might be necessary for the city to establish a system of public work during the winter to operate in connection. "The matter has reached a stage where something must be done—some comprehensive plan adopted so that the city, rather than private persons and scattered institutions, shall have the sole responsibility of this problem," said Mayor Hindley. "The county will also be asked to co-operate."

Moving Picture Films Will Advertise City's Attractiveness

Schenectady, N. Y.—A few days ago the Commercial Film Syndicate of New York wrote to Mayor George R. Lunn asking if he would co-operate with the company and assist it to get representative views of this city for exhibition in moving picture shows throughout the country. The Mayor thought the idea a good one from an advertising standpoint and referred the letter to President W. W. Wemple of the Board of Trade. President Wemple replied in a letter that he and the organization of which he is the head would gladly do everything possible to properly advertise Schenectady, and that he would act in co-operation with the film syndicate in having made pictures that would tell the world something about this city. The two big works will be depicted in exterior and interior views, other industries will be illustrated, the barge canal work will be shown, State street will be pictured and the beautiful residential section of the town placed before audiences if the scheme does not miscarry. Several other cities are now advertised by means of moving pictures at no cost to the cities, and it is believed that Schenectady films will be as interesting, if not more so, than any similar ones that have been shown.

Mayor Favors Establishment of Employment Bureau

Holyoke, Mass.—The probability of the establishment of a free municipal employment bureau in Holyoke is imminent. The order was passed recently in the Board of Aldermen and has been actively taken up by Mayor White. Our chief executive has communicated with the chief of the Bureau of Statistics and has been apprised that there is just sufficient appropriation to maintain free employment bureaus in three cities, Springfield, Fall River and Boston. A bill is now pending in the Legislature which may remove the municipal employment bureaus from the jurisdiction of the chief of the Bureau of Statistics. Undaunted by the receipt of the above information, Mayor White at once decided to consider the feasibility of a free municipal employment bureau, and if the project is practical he will put it through. Such a bureau would fill a long felt want in Holyoke, and would meet with popular approval.

Mayor Orders City Autos Numbered Consecutively

Holyoke, Mass.—Mayor White has issued a decree to the various municipal departments to the effect that all automobiles owned by the city shall be numbered consecutively. These numbers will be in addition to the State license required by law. All the autos will bear the words, "City of Holyoke," and then the department to which it belongs and the number of the machine as registered in that department. For instance: One of the Board of Public Works' machines will have printed on its body: "City of Holyoke, Board of Public Works, No. 1." The purpose of this system of registering is to determine the truth or falsity of any complaint lodged against any city official for driving a municipal machine after hours or out of the city limits. The Mayor stated that the inauguration of this system of registering was not due to any recent complaints, but was a plan which he had been contemplating for some time.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Assessment District—Street Railroad

City of Spokane vs. Curtiss et al.—Where the franchise of a street railroad company operating in a street was not subject to assessment by virtue of an ordinance, improving the street, the fact that the improvement was of benefit to the railway company did not show that the property accessible to the street car line on such street was not benefited, and hence the benefit to the railway company did not prevent a confirmation of an assessment imposing the entire cost of the improvement on abutting property so benefited.—Supreme Court of Washington, 120 P. R., 70.

Railroad Right of Way—Appropriation

Village of Rockport vs. Cleveland, C. C. & St. L. Ry. Co.—Evidence that the tracks proposed to be located over and across the streets sought to be appropriated are necessary in the use and operation of the switching yards of the railroad company does not authorize a trial court to find that such tracks are necessary within the meaning of section of Revised Statutes giving a railroad company the right to appropriate streets.—Supreme Court of Ohio, 97 V. E. R., 133.

Corporate Limits—Detaching Lands

Jones vs. City of Red Lake Falls. Skalla vs. Same.—In proceedings under Laws 1907, to detach land from the corporate limits of a city, if the court finds that the land contains not less than 40 acres, is unplatet, is used and occupied exclusively for agricultural purposes, and may be detached from such city without unreasonable affecting the symmetry of the settled portion of such city, it has no discretion to refuse a decree detaching such land, but must grant such decree.—Supreme Court of Minnesota, 134 V. W. R., 121.

Defects in Streets—Duties of Policemen

Mayor, etc., of City of Macon vs. Morris.—Policemen, unless what may be called their common-law duties have been enlarged, are mere peace officers, not chargeable with the duty of observing or inspecting the condition of the city highways, and in such cases are not channels for the communication of implied notice to the city of defects in a street; but the city may enlarge their powers by ordinances, rules or instruction affecting their employment, and putting on them the duty of inspecting for, and of reporting as to, defects, and in that event notice and negligence may be implied through them. (a) A like rule applies as to employees of the sanitary department. Primarily they would be concerned only with matters relating to public health; but the city may put on them the duty of observing and reporting the condition of other things (e. g., the condition of drains and sewers in the highways), and in that event notice and negligence may be implied through them.—Court of Appeals of Georgia, 73 S. E. R., 539.

Working City Streets—Validity of Laws

Whitehead vs. Mayor, etc., of Vienna.—A provision in the charter of a city, authorizing the Mayor and Council to require all male residents of the municipality between the ages of 16 and 50 years who have resided in the city for thirty days to work the streets of the city, or to pay a commutation tax in lieu thereof, is valid and enforceable as provided therein, although the general law of the State designated the persons subject to road duty, where the alternative road law is in effect as “between the ages of 21 and 50 years.”—Court of Appeals of Georgia, 73 S. E. R., 533.

Municipal Offenses—Crimes

Moore vs. City of Winder.—“Municipal offenses” are not “crimes,” within the purview of the constitutional provision relating to the venue of actions.—Court of Appeals of Georgia, 73 S. E. R., 529.

Ordinances—Record—Regularity

Harrison vs. City of Greenville et al.—An ordinance is not vitiated by making the original record up by pasting a clipping of the ordinance as printed in a newspaper in the Council minute book.—Court of Appeals of Kentucky, 142 S. W. R., 219.

Contracts—Liability of City

Stivers vs. City of Cherryvale.—When a city receives a bid for preparing certain plans and specifications, instructs its attorney to draw a contract, and directs the bidder to proceed without waiting for the contract to be signed, and the bidder thereupon proceeds with the work until it is nearly completed when he is directed to cease, held, that the city is liable to him for the fair cost and value of what he has done, whether it has actually received any benefit therefrom or not.—Supreme Court of Kansas, 120 P. R., 361.

Change of Grade—Damages—Evidence

Harman vs. City of Bluefield et al.—Where, in changing the grade of a street, the city replaced a wooden bridge across a stream which ran through an abutting owner's lot with a concrete culvert, and made a considerable fill along the edge of plaintiff's lot on both sides of the stream, and in an action against the city the declaration alleged that, by reason of said trespasses, water has, from time to time, been caused to flow upon the lot, and to soak into and under the dwelling house, evidence that the culvert erected by the city was not large enough to let the water pass through at times of high tide, and that it caused the water to overflow his lot and endangered his property, was admissible.—Supreme Court of Appeals of West Virginia, 73 S. E. R., 296.

Employe's Tenure—Discharge—Volunteer Firemen

People ex rel. Conley vs. Beach et al., Board of Fire and Police Commissioners.—Though the act incorporating the volunteer fire companies of a city was repealed prior to relator becoming a member of one of them, yet it having continued as a voluntary association, and the city having accepted the services of such volunteer firemen, and recognition of them as a part of its fire department having been shown by it and its officers in every possible way, he, having been given by the Fire and Police Commissioners an honorable discharge for five years of such service in the fire department, cannot by such commissioners be discharged from his position of city policeman, except on notice and hearing, under Civil Service Law, protecting against removal, except for cause, after a hearing on notice, one holding a position by appointment or employment in a city, who shall have served the time required by law in its volunteer fire department.—Court of Appeals of New York, 97 N. E. R., 39.

Streets—Rights of Owners of Trees

Robinson et ux, vs. City of Spokane.—Rem. & Bal. Code declares that all streets shall be under the control of city authorities. A section grants to cities of the first class the power to improve streets and control the use thereof and vacate the same. The charter of the city of Spokane provides that the city shall have the sole control of all the streets dedicated to the public use, and that the fee of all property so dedicated shall vest in the city. Held, that any right granted to abutting owners to plant trees in the street was a mere permissive right, which might be revoked at any time; and that the city might, on revoking the license, cause the removal of the trees, without liability to the owner of the abutting property, if such removal was necessary in carrying out any system of street improvements.—Supreme Court of Washington, 120 P. R., 101.

Obstruction of Street—Estoppel—Injunction

City of Newberg vs. Kienle.—In an action by a city to enjoin defendant, an abutting owner, from extending a building in the course of erection beyond the line of the street where defendants had not occupied the property beyond the line or been induced by the city to do any act or make any expenditure upon the grounds outside of such line, and where defendants had sufficient knowledge to put him on inquiry as to the city's right, there was no estoppel against the city.—Supreme Court of Oregon, 120 P. R., 3.

Patrolmen—Wrongful Removal

Peterson v. City of Butte.—Where police officers were wrongfully removed by the mayor, and successfully prosecuted mandamus to compel their reinstatement, the fact that they made no effort in such proceedings to recover their salary for the time intervening between their removal and reinstatement did not preclude a subsequent suit to recover such compensation.—Supreme Court of Montana, 120 P. R., 483.

MUNICIPAL APPLIANCES

One-Car Asphalt Paving Plant

The East Iron & Machine Co., Lima, O., manufacture the Merriman asphalt paving plant, carried on a single car, 65 feet long. The capacity of the plant is stated to be 1,800 square yards of 2-inch topping in ten hours. However, the conditions governing a day's work are so variable—the weather and the personal element—that the actual record of a year's work is really more to the point. The manufacturers state that one plant has laid 114,000 square yards of finished work, besides traveling 1185 miles; another plant laid 162,000 square yards and traveled 1,260 miles; another plant laid 28,000 square yards of 3-inch finished work in 24 working days.

The illustration shows the general arrangement of the main pieces of machinery, the boiler being at one end, the sand dryer and tanks both occupying the same floor space, coming next; then mixing platform, occupying an extension on the end of the plant. Steam is furnished by a 125-horsepower marine type return flue boiler capable of carrying a pressure of 165 pounds when necessary. Power is supplied by four engines, one situated near the boiler for turning the drum; one operating the hot sand elevator and screen; one the mixer, and a hoisting engine for elevating barrels of asphalt up into the melting tanks.

The sand drier is 28 feet long and 5 feet 6 inches in diameter, of the return heat type, the heat passing around the outside of the drum and back through it. The drum is carried on heavy shafts by means of two substantial spiders at each end.

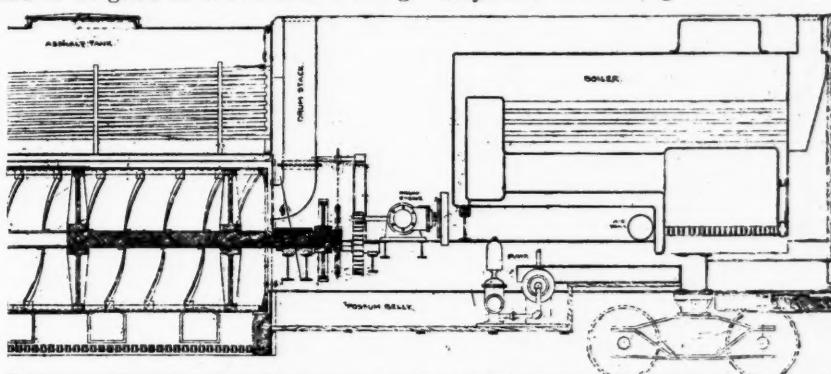
There are two asphalt tanks situated over the sand dryer, each having a melting capacity of 712 cubic feet. Each tank contains four pipe coils which are continuous from end to end; the coils are of 1½ double strength pipe and there are 1,130 lineal feet in each tank. All joints are outside of the tanks. The tanks are covered, a manhole with substantial cover being provided for loading. Melted asphalt runs into the delivery pipe through a cone valve.

The pipes for conveying the asphalt to the weighing box on the mixer platform are steam jacketed. The condensed steam from the coils returns to the boiler by means of a hot water pump working automatically. The tanks are piped for steam or air agitation.

From the dryer the hot sand or stone drops into the boot of an elevator which carries it to a screen above the mixing platform. This elevator, like the cold sand elevator, is provided with a clutch pulley. Under the screen is a storage tank with overflow pipe. The sand is weighed in a box before being

connection with garbage destructor plants or electric lighting plants, where surplus steam has been generated. In a small way a number of cities do distribute steam from one boiler plant to a number of buildings for heating. Such projects involve the question of suitable conduits for the steam pipe in order that the loss of heat may be reduced to a minimum. It is claimed that the J.-M. steam conduit made by the H. W. Johns-Manville Co., 100 William street, New York, saves at least 90 per cent. of the heat lost in transmission through unprotected or poorly insulated pipes.

The J.-M. sectional conduit is manufactured from a thoroughly ground and mixed combination of stoneware clay, fire clay and spar, being free from iron, lime or other injurious impurities. The clays are selected, ground and mixed



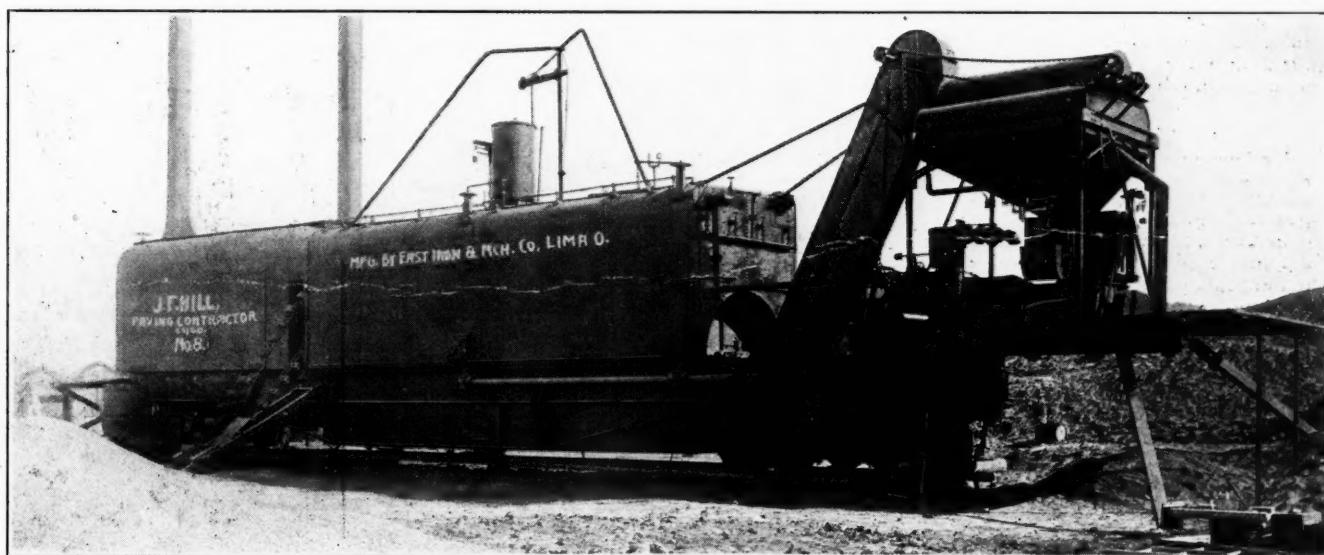
SECTION OF PART OF SAND DRYER AND POWER END OF MERRIMAN ASPHALT PLANT.

discharged into the mixer. The asphalt is weighed in a bucket moving on a traveler. The mixing platform and appurtenances are ingeniously arranged as regards space and arrangement for shipping. The hot sand tank, screen, mixer, mixer engine, hoist and elevator engines are all on a sliding carriage at the end of the plant, which is slid out into its operating position by means of large screws. The hot sand bin is raised into position by screws.

Conduit for Steam Pipe from Central Plant

The question of establishing municipal steam heating plants has been discussed recently in several cities. The matter has generally come up in con-

nection with garbage destructor plants or electric lighting plants, where surplus steam has been generated. In a small way a number of cities do distribute steam from one boiler plant to a number of buildings for heating. Such projects involve the question of suitable conduits for the steam pipe in order that the loss of heat may be reduced to a minimum. It is claimed that the J.-M. steam conduit made by the H. W. Johns-Manville Co., 100 William street, New York, saves at least 90 per cent. of the heat lost in transmission through unprotected or poorly insulated pipes.

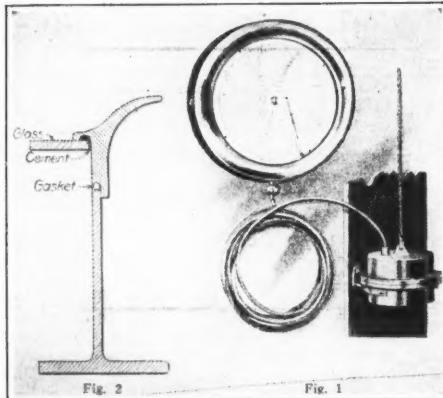


GENERAL VIEW FROM MIXER END OF EAST IRON & MACHINE CO.'S ONE-CAR PORTABLE ASPHALT PLANT.

by being divided longitudinally in two sections, forming the top and bottom halves of the conduit. A serrated edge without a glaze is left so that the cement will make a perfect joint.

New Recording Liquid Level Gauge

The recording liquid level gauge shown in the illustrations is designed by the Industrial Instrument Co., Foxboro, Mass., to make continuous records in ink on a circular chart of the height of water or other liquids in tanks, water in reservoirs, dams, forebays, tail races, sewers, etc. It consists of an improved round form recording gauge connected by means of a small copper tube to a rubber diaphragm, enclosed in a brass case, the lower section of which is perforated for the admission of the liquid. A pressure equivalent to the depth is exerted against the diaphragm and this pressure is transmitted as compressed air through the connecting tube and recorded on the circular chart which revolves once in 24 hours or 7 days, as desired. Fig. 1 shows the compact diaphragm movement employed for the ranges up to 20 feet depth. The pen arm is attached to and supported by a small but substantial shaft, which serves as an axis of rotation, giving ruggedness and stability for service. Fig. 2 shows how the



CONTINUOUS WATER LEVEL RECORDER.

recorder is made moisture and dust tight by means of a gasket between the door and body of the case, and by cementing the glass in the door. The recorder may be located at any convenient place, the connecting tube being 100 feet long, if necessary. The advantage of distance from the location of the bulb, so that the equipment is not affected by freezing temperature, will be appreciated.

Toncan Metal

Toncan metal is an iron ore product of great purity, density and homogeneity. It combines durability, toughness and ductility with rust resistance. It is soft and pliable. It works up better than mild steel. It stands forming, bending and seaming. It has fine welding and drawing properties. It does not crack or break like iron in working. It costs less than charcoal iron—not much more than steel. It fills the need which has existed for a sheet metal having the general adaptability of steel and iron sheets, but more resistant to corrosion and at the same time of moderate cost. Toncan metal is made up in sheets, plain or corrugated, with corrugations from $\frac{1}{8}$ to 3 inches in width, also in roofing, weather board siding, imitation rock-faced stone, siding, etc.

Diaphragm Pump

The Barnes Manufacturing Company, Mansfield, O., manufacture a contractors' diaphragm pump which is de-



CONTRACTORS' DIAPHRAGM PUMP.

scribed as being non-chokable. Two styles are made, one with bottom suction, the other with side suction, the latter shown in the illustration. They are made in three sizes— $2\frac{1}{2}$ -inch, capacity 1,800 gallons per hour; 3-inch, capacity 3,500 gallons; 4-inch, 6,000 gallons. The general design is of the ordinary type. The strong points claimed for the pumps are the high quality of materials and workmanship. The suction hose has a rubber lining, protecting the wire from rust. It is very flexible and strong. The diaphragms are made of the best Para rubber. The strainers are made of iron, painted or galvanized, also of brass.

Four-Wheel Drive Gas Tractor

The Heer Engine Company, Portsmouth, O., manufacture a gasoline tractor in which the driving power is applied to all four wheels. The machine is suitable for drawing trains of wagons and for driving crushers or other kinds of contractors' machinery. It is made in four sizes, namely, 16, 25 and 40 brake horsepower, or 12, 20 and 32 horsepower tractive power. It is claimed that the even distribution of power on all four wheels eliminates stress and strain, reducing the cost of repairs as well as fuel cost. Used as a tractor for a wagon train it will make a speed of $4\frac{1}{2}$ miles an hour on a country road. The four-wheel drive will turn in an 8-foot inner circle.

The illustration shows the tractor complete with friction clutch pulley for belt power. The simplicity of the construction is apparent. The wheels are free of encumbrances and gears. The master gear does not work directly upon the wheels and the latter can be removed without disconnecting any vital part of the tractor. The cab is comfortable in any kind of weather. The fuel tank is in the cab. The radiator is air cooled, the air intake being on the opposite side, as are also the transmission gears. The master gear is in direct connection with the engine crank shaft. The drive is by chains passing over sheave wheels mounted on both shafts. The chains are hand made. Hyatt roller bearings are used throughout. The frame and engine ride on bumper springs. Some points in the specifications follow:

Weight—9,000 pounds.

Height—Top radiator, 6 feet 6 inches; on cab, 8 feet 4 inches.

Length—14 feet over all.

Width—6 feet 6 inches over all.

Wheels—51 inches diameter; 30 heavy cleats riveted on two 2-inch angles; $30\frac{1}{4}$ -inch spokes; 15 on a side; 12-inch tread on each wheel.

Transmission—Sliding gear. Absolutely locked on speeds on steel gears. Controlled absolutely by one lever.

Tread—from outside to outside edge of wheels, 6 feet $5\frac{1}{4}$ inches.

Clutch—Expanding, with hardwood blocks against iron. Operated with rack and gear pinion, making it easy and certain.

Speeds—Forward, 1 and 3-5; $2\frac{1}{4}$ and $4\frac{1}{2}$; reverse, $2\frac{1}{4}$ miles per hour. These speeds are obtained when controlled by the engine governors. With the hand throttle any speed can be obtained from $\frac{1}{4}$ to 6 miles per hour, on any gear. All speeds operated with one lever.

Brake—Operated with foot lever.

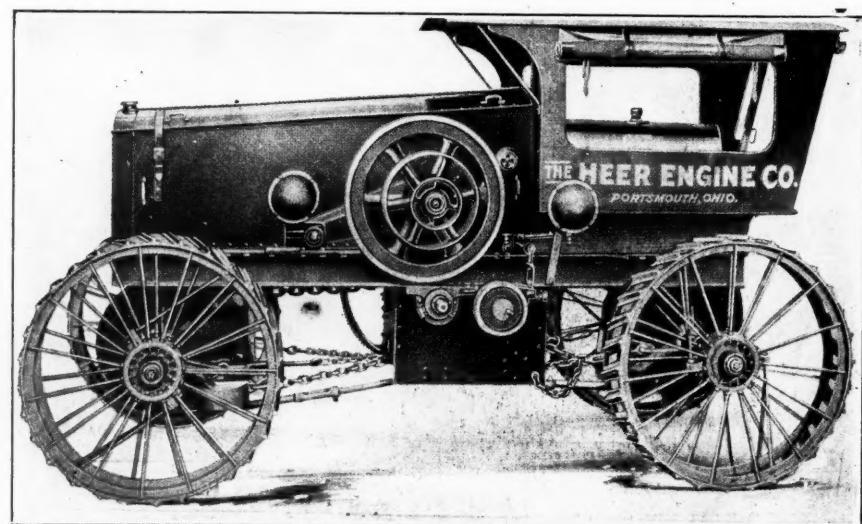
Cooling System—Radiator and fan.

Control—The engine has an automatic governor acting directly upon the carburetor throttle. There is also a hand control, allowing greater variations in speed to be made quickly.

Engine—This is a Heer two-cylinder opposed type. By loosening four bolts the engine can be removed so as to be used elsewhere. For fuel, gasoline, California distillate or kerosene may be used.

Governor—Throttle fly, ball type.

Lubrication—Force feed.



HEER GASOLINE TRACTOR FOR DRAWING WAGONS AND SUPPLYING POWER.

NEWS OF THE SOCIETIES

Illinois Water Supply Association

The fourth annual meeting will be held March 5-6, University of Illinois, Champaign-Urbana. The following program has been prepared:

Tuesday, March 5, 10 a. m., Lecture Room, Engineering Building—President's address, O. T. Smith, superintendent and secretary Freeport water works; report of the secretary-treasurer, E. Bartow; reports of committees; "Pumping by Steam and Electricity," E. MacDonald, superintendent Water and Light Company, Lincoln; "Does the Water Meter Increase Revenue, Reduce Consumption and Satisfy the Consumer?—Experience at Elgin," R. R. Parkin, chief engineer, water department, Elgin; "Effect of Installing Meters at Decatur," H. Ruthrauff, commissioner public property, Decatur; "New Work of the State Water Survey," E. Bartow; miscellaneous papers. 2 p. m., Lecture Room, Engineering Building—"Limitation of Streams Pollution," Paul Hansen, engineer State water survey; "Water Department Methods," W. J. Spaulding, commissioner of public property, Springfield; "Purchase of Coal in Accordance with Specifications," W. O. Collins, vice-president Gulick-Henderson Company, Chicago; "Storage of Coal," S. W. Parr, professor of applied chemistry, University of Illinois; "Color in Mississippi River Water," W. F. Monfort, chemist water department, St. Louis, Mo.; "Anchor Ice," L. C. Trow, chief engineer water company, Lake Forest; "Nitrite Reduction Test Applied to Montana Waters," W. M. Cobleigh, professor of chemistry, Montana State College, Bozeman, Mont. 7 p. m., Y. M. C. A. House, annual dinner. 8.15 p. m., Lecture Room, Engineering Building—"The Necessity for Safe Water Supplies in the Control of Typhoid Fever," Dr. A. J. McLaughlin, surgeon U. S. Public Health and Marine Hospital Service, Washington, D. C.; "Typhoid Fever and the Water Supply of Mattoon," R. A. Gabbert, president Chamber of Commerce, Mattoon; "Characteristics of Typhoid Fever Outbreaks," H. N. Parker, bacteriologist University of Illinois; "The Detailed Procedures for Epidemiological Investigation for Typhoid Fever," H. W. Hill, M.D., director Division of Epidemiology, Minnesota State Board of Health, Minneapolis.

Wednesday, March 6, 9.30 a. m., Lecture Room, Engineering Building—"Record of Tests of New Wells Made by Weir Measurement," Owen T. Smith; "Some Interesting Observations on the Disinfection of Lake Water with Calcium Hypochlorite," Arthur Lederer, M.D.; and Frank Bachmann, sanitary district of Chicago; "Hypochlorite Sterilization of Lake Michigan Water at Evanston, W. Lee Lewis, professor of chemistry, Northwestern University, Evanston; "Hypochlorite Sterilization and Typhoid Fever at Kansas City, Mo.," W. M. Cross M. D., city chemist; "Installation and Successful Operation of a Million-Gallon Gravity Filter Plant," John M. Keefer, mayor, Macomb; "Filter Plants" (illustrated), W. W. DeBerard, western editor *Engineering Record*, Chicago; "Deep Wells, Joliet," H. A. Stevens, city engineer; "Artesian Wells of Western Kansas,"

C. C. Young, chemist Kansas State Water Survey, Lawrence. 2 p. m., Lecture Room, Engineering Building—Election of officers; "Illinois Legislation on Public Utilities Commission," Senator John Dailey, Peoria, chairman legislative committee on Public Utilities Commission; "Incrustation in Water Mains at Mt. Vernon," F. M. Sinsabaugh, general manager Citizens' Gas, Electric & Heating Co., Mt. Vernon; "Composition of the Incrustation in the Mt. Vernon Water System," H. P. Corson, chemist State Water Survey; "Purification of Water at Tulsa, Okla.," B. H. Sands, superintendent water works; "Trials and Troubles of the Pumping Station and Their Remedy," M. M. Symons, chief engineer Danville Water Company; "Sanitary Survey of Mississippi River at Moline," E. Bartow; "Further Tests on the Removal of Iron from a Drift Well Water," A. N. Talbot, professor M. and S. E., University of Illinois; miscellaneous papers.

Western Society of Engineers

At the recent annual meeting and dinner held the report of the secretary showed a membership of 1,139, as against 1,119 at the beginning last year. The new constitution, which went into effect with 1911, established a grade of membership (student members) for students at engineering schools, and there are now a few members in this grade. The attendance at the meetings has been somewhat small, averaging only 75, even when including an attendance of 450 at the special Steinmetz meeting of the electrical section. The library of the society is not kept exclusively for members, but is open to the public. This item corrects an error in these columns Feb. 8, to which our attention has been called by Ernest McCullough, Chicago, a trustee of the society.

Connecticut Society of Civil Engineers

The 28th annual meeting of the Connecticut Society of Civil Engineers opened Feb. 13, at 10.30, in the Mason laboratory in New Haven. The meeting was continued two days, the annual dinner having been held Tuesday evening at Heublein's when Mayor Rice and others gave informal talks.

At Tuesday morning's session the annual election of officers was held, and the present officers re-elected. The roster for the present year is: Charles A. Ferry, of New Haven, president; A. William Sperry, of New Haven, first vice-president; Sheldon E. Minor, of Greenwich, second vice-president; J. Frederick Jackson, of New Haven, secretary and treasurer, and Clarence M. Blair, of New Haven, assistant secretary.

The reports of the secretary and treasurer were read and 23 new applicants admitted to membership. At the afternoon session George W. Fuller, consulting engineer, of New York, spoke on "Recent Developments in the Art of Sewage Disposal," following a short talk by Prof. Breckenridge. Edward W. Bush read a paper on "The Saybrook Bridge Over the Connecticut River" on Tuesday.

North Dakota Society of Engineers

The fourth annual convention of the society was held at Grand Forks February 15-16. The following programme was carried out:

9.30 a. m., Thursday, February 15, City Hall—Address of welcome, Mayor M. F. Murphy; response, President Samuel F. Crabbe; reading of minutes; reports of officers; reports of standing committees; address, "A Short Flight of Steps," W. A. Baker, county surveyor, Richland county. 2 p. m., Thursday—State University at Mining Engineering building; adjournment to Mechanical Engineering building; reports of the concrete committee on tests, methods and materials, individual reports and general discussion by committee and others; A. J. Becker, University; R. H. Slocum, Agricultural College; E. J. Babcock, University; F. L. Anders, Fargo; G. A. Abbott, University; J. A. Jardine, Fargo; A. G. Leonard, University; H. A. Hard, Agricultural College; H. G. Lykken, Grand Forks. 7 p. m., Thursday, State University Commons building, annual banquet; toastmaster, Geo. A. Abbott, University; addresses by President F. L. McVey, State Engineer T. R. Atkinson, and others.

9.30 a. m., Friday, February 16, City Hall—Address, "Lignite and Lignite Mining," H. R. Evans, city engineer, Williston; address, "Fuel Gas," M. L. Hibbard, general manager Union Heat, Light & Power Co., Fargo; address, "Street Railway Track Construction as It Affects Paved Streets," C. P. Brown, general manager Fargo & Moorhead Street Railway; address, "County Highway Bridges," J. A. Jardine, Jardine Bridge Co., Fargo. 2 p. m., Friday, City Hall—Address, "The Mattoon, Illinois, Water Works," R. H. Slocum, Agricultural College; general business session; president's address; election of officers; adjournment. The Grand Forks Commercial Club was the headquarters of the Society of Engineers before and after all sessions.

The following officers were elected: H. G. Lykken, president, city engineer, Grand Forks; T. R. Atkinson, first vice-president, State engineer; S. F. Crabbe, second vice-president, county engineer, Cass county; E. F. Chandler, secretary-treasurer, professor mathematics, State University.

Bismarck was chosen as the meeting place in 1913.

Massachusetts State Highway Association

Mayors of a number of Massachusetts cities were guests of the Massachusetts Highway Association at its annual meeting at the Quincy House Feb. 8. Before dinner officers were elected as follows: President, John R. Rablin, chief engineer of the Metropolitan Park Commission; vice-president, Francis H. Kendall, county engineer for Middlesex; secretary, J. M. McCarthy; treasurer, Charles A. Brown, of Wellesley; directors, Louis K. Rourke and Richard A. Jones. After dinner Harold D. Parker, formerly chairman of the Highway Commission, was toastmaster. Mayor Burns, of Somerville, was the first speaker. Then followed Mayor Barry, of Cambridge; Mayor Adams, of Salem; Mayor Duane, of Waltham; Mayor Gleason, of Marlboro; Mayor French, of Melrose; Mayor Taylor, of Medford, in the order named. Former Chairman McClintock, of the Highway Commission, told of the work accomplished.

PERSONALS

RICHARDSON, CLIFFORD, Consulting Engineer, New York City, on February 16 delivered a lecture on "Trinidad and Bermudez Asphalts and Their Use in Highway Construction," before the graduate students in highway engineering at Columbia University.

HUYCK, PHIL, Baton Rouge, La., has been elected Chief of Police.

CLARK, C. O., Consulting Engineer, Toledo, Ohio, has been selected by city officials of Sandusky to give final advice in the reconstruction of the filtration plant.

GAUEL, VIC., Donaldsonville, La., has resigned as Chief of the Donaldsonville Fire Department.

DUNHAM, SAMUEL G., Hartford, Conn., has been elected president of the Hartford Electric Light Co. He succeeds his brother, Austin C. Dunham, who has been head of the company for over thirty years.

KESSLER, GEORGE E., Landscape Engineer, Kansas City, Mo., will be retained by the Dallas, Tex., Park Board for the year 1912 to carry out plans and suggestions for beautifying the city.

SWEETLAND, H. M., New York City, has been elected Chairman of the Board of Directors of Wyckoff, Church & Partridge, Inc., New York City, automobile manufacturers. Mr. Sweetland is one of the pioneer publishers in the class periodical field. He controlled at various times the following successful publications: *Power*, *The Engineering and Mining Journal*, *The Automobile, Motor Age*, *The American Architect and Municipal Journal*.

Calendar of Meetings

March 4-6.

National Paving Brick Manufacturers' Association.—Annual Meeting, Congress Hotel, Annex, Chicago, Ill.—Will P. Blair, Secretary, Engineers Building, Cleveland, O.

March 5-6.

Illinois Water Supply Association.—Annual Meeting, Urbana, Ill.—E. Bartow, Secretary, Urbana.

March 7-12.

International Brick and Clay Products Exposition.—Coliseum, Chicago, Ill.—Office, 815 Chamber of Commerce Bldg., Chicago, Ill.

March 11-16.

National Association of Cement Users.—Annual Convention, Kansas City, Mo.—Edward E. Krauss, Secretary, Harrison Building, Philadelphia, Pa.

March 14-21.

First Annual Kansas City Cement Show.—Convention Hall.—J. P. Beck, General Manager Cement Products Exhibition Co., 72 W. Adams St., Chicago.

March 28-29.

American Society for Testing Materials.—Annual Meeting, New York City.—Edgar Macbury, Secretary, University of Pennsylvania, Philadelphia, Pa.

April 16-17.

Tri-State Water and Light Association of the Carolinas and Georgia.—Annual Meeting, Salisbury, N. C.—J. W. Neave, Secretary, Salisbury, N. C.

June 3-8.

American Water Works Association.—Annual Convention, Louisville, Ky.—John M. Diven, Secretary, Troy, N. Y.

June 10-12.

Mayors Conference of New York.—Third Annual Meeting, Utica, June 10-12.—Mayor C. C. Duryee, President, Schenectady, N. Y.—C. C. Capes, Secretary, New York.

July 10-12.

Fire Marshals' Association of North America.—Annual Convention, Hotel Cadillac, Detroit, Mich.—Michigan State Fire Marshal Palmer, President, Lansing, Mich.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—A number of moderate-sized municipal lettings are pending. There has been a fair amount of buying of pipe by the railroads. Quotations: 4-inch, \$27; 6 to 12-inch, \$25; 16-inch and up, \$24.50. Birmingham—Tonnage placed with local producers consists mainly of small lots for maintenance work. Several large inquiries have been received. The local plants continue to operate steadily. The North Birmingham plant of the U. S. C. I. P. & F. Co. will probably be ready for operation May 1, when the Bessemer plant will be shut down for extensive repairs. Quotations: 4 to 6-inch, \$23; 8 to 12-inch, \$22; over 12-inch, average, \$21. New York—Buying by private consumers continues in better volume than usual for the season. Quotations: 6-inch, car loads, \$22 to \$23.

Lead.—The dulness in the lead market continues. Quotations: New York, 4.05c.; St. Louis, 4c.

Cement.—Spokane, Wash., has been made the center around which a price-cutting "war" on cement threatens to revolve. Mills from Montana to California are entered in the "war," and as a result of the move of the Inland Portland Cement Company at Metaline Falls to create a "home market" and drive other products out of the Spokane territory if possible, new prices from the other mills have been announced. The Three Forks Portland Cement Company, of Trident, Mont., manufacturers of what is known as "Red Devil" cement; the new International Portland Cement Company at Trent, which will operate June 1, and the Western Building Material Company at San Francisco have reduced the price to \$2.20 a barrel, the same as that announced by the Inland Portland Cement Company. The action was started in California some weeks ago, when the California product in carload lots delivered in the inland empire was reduced in price. The reduction of the Inland company was made immediately following the receipt of the announcement from California. It is understood that the goal of the cement companies at this time is the Northern Pacific grade separation and improvements at Yardley, and this situation is responsible for the price cutting.

New Incandescent Lamp.—A plant for the manufacture of a new incandescent lamp is proposed to be built in Los Angeles, Cal., by John C. Wichmann, of Berlin, Germany, the inventor of a new composition of metals called Tribal. The General Electric Company and the Westinghouse Company are said to be experimenting with the new product with a view to using it for a filament. It is stated that the new filament will give lamps a candle-power of as much as 3,000 if desired.

Piping Materials.—The Best Manufacturing Co., Pittsburgh, Pa., announce that they have engaged the services of Howard W. Evans as general manager of their sales, order and engineering departments. Mr. Evans is a specialist in matters pertaining to piping materials for power plants. Mr. Evans was formerly connected with the Crane Company, Chicago, Ill.

Calcium Chloride.—The Solvay Process Co., Syracuse, N. Y., have published a very attractive illustrated booklet describing the characteristics and uses of Solvay granulated calcium chloride. When it is remembered that two years ago this was almost an unknown material, at least to road builders, and that now it is used almost everywhere, the growth of the business may truly be characterized as remarkable. The booklet describes the appearance and physical properties of the material, its binding properties and action as a road binder, affecting as it does not only the surface but the mass of the road material. Methods of applying are described and the small amount of skill needed is pointed out. The company now makes both a one-horse and a two-horse machine for reducing the cost of distribution where large areas are treated. One point not generally appreciated, perhaps, but of, perhaps, very considerable importance is the fact that even weak solutions of calcium chloride have a germicidal effect. Photographs of culture plates containing extracts of sifted road dust, in one case from a road treated with calcium chloride, the other from an untreated road, are shown. The sample from the treated road showed only three bacterial culture centers and that from the untreated road 347.

Engineering Directory.—The Crawford Publishing Co., 537 South Dearborn street, Chicago, Ill., publish a convenient directory intended for daily use by jobbers, manufacturers and retailers of goods used for plumbing, heating and lighting purposes and for equipping mills. It contains a list of wholesale dealers in plumbing, lighting and heating supplies. The list of jobbers and dealers in mill, steam mine and railway supplies, tools and machinery is of value as a daily reference and mailing list. There is also a list of water works and gas companies, power plants and wholesale dealers in hardware and electrical supplies and purchasing agents of railroads. There is a cross index to manufactured articles classified in the directory. This is the nineteenth annual edition.

Cranes.—As indicating the general improvement in conditions an interesting statement is made by one of the leading crane builders in northern Ohio. This is to the effect that this company now has orders on its books for cranes and steel plant equipment aggregating 75 per cent. of the total volume of its business in 1911.

Valves and Hydrants.—The Pratt & Cady Co., Hartford, Conn., manufacturer of hydrants, valves and fittings, will increase its capital stock from \$400,000 to \$500,000, the new capital to be used for the enlargement of the plant. Just what departments will be increased will not be determined until a little later. The recent growth of the business has been so great that the company finds it necessary to increase its manufacturing equipment.

Pumps.—The Canton-Hughes Pump Company, Wooster, O., is preparing plans for a large addition to its plant, on which work will be started in the spring. The new structure will be used for foundry purposes.

PATENT CLAIMS

Reflectors and Illuminating Specialties.—The H. W. Johns-Manville Company, who own the J. M. Linolite system, have made an extensive addition to their line of lighting devices by the acquisition of the selling agency of the I. P. Frink products. Frink reflectors and fixtures have been on the market for fifty years. By this arrangement the W. H. Johns-Manville Company state that they will be in a position to design and sell lighting systems for every known form of artificial illumination. An engineering department will be maintained along very extensive lines. This department will maintain a corps of engineers throughout the United States and Canada, and be equipped to place data and recommendations in the hands of all interested in any subject pertaining to illumination.

Power Proposition.—Solomon-Norcross Co., engineers, Candler building, Atlanta, Ga., are conducting negotiations regarding the supply of electric power to the city of Atlanta. The source of the power under consideration is from the plant on the Broad river, which when fully developed, Mr. Solomon says, will be capable of delivering 18,000 ten-hour horsepower in the driest years and 25,000 in average years. The proposition is to sell power to the city for about 1 cent per kilowatt hour or sell the whole plant for 8 per cent. above the cost of construction.

Ardmore Asphalt.—The Bert-Hahn Paving Co., Ardmore, Okla., makes a specialty of asphalt paving and does a general construction business. Ardmore asphalt is used exclusively by the company. The company is reported to be doing a good business and to have contracts for several months ahead. A trial block of this paving laid in Kansas City twenty-five years ago is said to still remain intact except for a few minor repairs.

NEW CORPORATIONS

The Rose Paving Co., 147 North Warren street, Trenton, N. J.; paving of streets, building of bridges, viaducts, etc.; capital, \$100,000. Incorporators: Alfred A. Rose, James C. Tattersall, H. Arthur Smith, all of Trenton, N. J.

The Bellepoint Water Works Co., Bellepoint, W. Va.; capital, \$5,000. Incorporators: J. A. Woodrum, Ben D. Keller, C. L. Miller and D. A. Halsted, of Bellepoint.

Standard Fire & Rubber Co., Springfield, Mass.; manufacturing of tires and rubber goods; capital, \$10,000. Incorporators: William P. Cromie, 104 Portland street, Boston; Wyne E. Hughes, 216 Main street, Springfield.

Dorchester Sand Co., Boston, Mass.; dealing in sand; capital, \$40,000. Incorporators: Walter E. Brownell, 73 Tremont street, Boston; Alfred H. Borden, 65 Grampian Way, Dorchester; W. E. Brownell, 73 Tremont street, Boston.

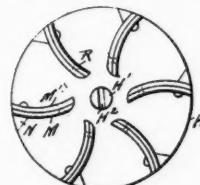
Sherrill Engineering & Construction Co., Hudson Falls, N. Y.; engineering and construction; capital, \$8,000. Incorporators: Geo. Sherrill and James D. Sherrill, both of Hudson Falls, N. Y.; and George V. Sherrill, Glens Falls.

Keokuk Water Works Co., Delaware Trust Co., Wilmington, Del.; capital, \$600,000.

Leudite Guarantee Construction Co., Delaware Trust Co., Wilmington, Del.; capital, \$200,000.

1,015,552. WATER-METER. Ernest E. Gamon, Newark, N. J. Serial No. 481,083. Divided. Serial No. 512,513.

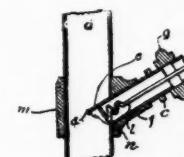
In a hot water meter, the combination of a turbine and means therefor controlled by the temperature of the water



for varying the speed of said turbine, comprising compound blades of materials having different coefficients of expansion fixed at one end to the turbine disk near its outer edge.

1,016,026. PIPE-TAPPING MEANS. Charles W. Metcalf, San Diego, Cal. Serial No. 566,374.

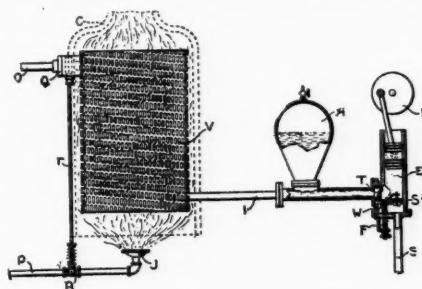
A device of the character described, comprising a clamp provided with a threaded hole and adapted to be placed around a main pipe, a relief pipe provided with a cutting end threaded to correspond with the threaded hole in said



clamp and adapted to be screwed into said threaded hole and thence through the wall of said main pipe, and a valve means for regulating the flow of liquid from said main pipe through the opening therein, all substantially as set forth.

1,015,982. METHOD OF REGULATING AND CONTROLLING THE PRODUCTION OF STEAM. Elihu Thomson, Swampscott, Mass., assignor to General Electric Co., a Corporation of New York. Serial No. 646,752. Divided. Serial No. 131,642.

The method of generating vapor which consists in supplying liquid to a generator and fuel to a burner, regulating the



supply of liquid to the generator in accordance with the pressure of the vapor generated, and regulating the supply of fuel to the burner in accordance with the temperature of said vapor.

1,017,394. SMOKE SEPARATOR. Joseph Dvorak, Pittsburgh, Pa. Serial No. 632,372. (Cl. 110—142.)

A smoke separator comprising a frustoconical hood, an elbow for connecting the contracted end of the hood to a stack, a liquid supply pipe extending longitudinally with respect to said hood and provided with spaced openings constituting outlets, a series of spaced liquid ejectors mounted upon said pipe and each surrounding an outlet, the diameters of the respective ejectors increasing to provide a series of ejectors having the peripheral edges parallel with the inner face of the hood, and a blower mounted upon said pipe ahead of the ejectors in the direction of flow of the gases.

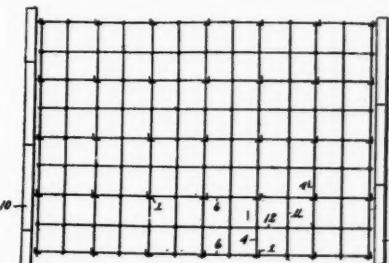
1,016,934. FLUID METER. Thomas Charlton, Chicago, Ill. Serial No. 598,614.

A meter comprising a check valve having a weight approximately equal to the

weight of the water it displaces and arranged in the fluid passageway within the meter to prevent the flow of fluid through the meter in a direction opposite to normal.

1,017,118. REINFORCEMENT FOR CONCRETE ROADWAYS. Avila Thomas, Detroit, Mich., assignor to Thomas Steel Reinforcement Co., Detroit, Mich., a Corporation. Serial No. 604,030.

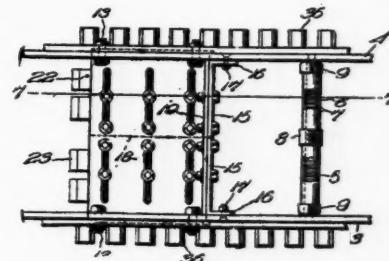
Reinforcing structure for concrete bodies, comprising supporting members



L-shaped in cross section, longitudinal and transverse tension members passing through the wings of said angular supporting members and crossing at right angles, and integral locking tongues on said supporting members movable into locking engagement with said tension members for preventing longitudinal movement of the tension members through the wings of the supporting members.

1,016,127. EXCAVATING MACHINE. Chalmers S. Brown, Findlay, Ohio, assignor to The Buckeye Traction Ditcher Co., Findlay, Ohio, a Corporation of Ohio. Serial No. 652,365.

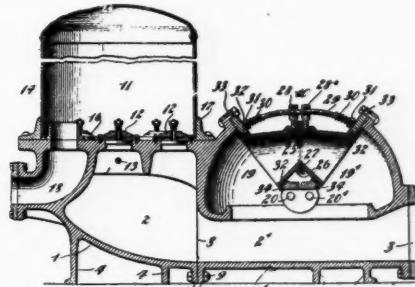
In an excavating machine, the combination of a plurality of rotatably mounted rims, means transversely adjustably con-



nected the rims together, adjustable buckets connecting the rims, means for rotating the rims, and an adjustable guard for preventing the falling of material from the buckets, substantially as described.

1,015,949. HYDRAULIC RAM. Alfred H. Francfort, Jersey City, N. J. Serial No. 612,673.

In a hydraulic ram, a valve comprising a movable element having a passage therein through which liquid may flow, said element having a sloping wall, and a member having an aperture therein in



which said element is adapted to move, said member being adapted to coact with said sloping wall to form a substantially liquid tight closure, and separate auxiliary means for stopping the flow of fluid through the passage in said movable element.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK.	ADDRESS INQUIRIES TO
STREET IMPROVEMENTS				
Illinois.....	Chicago.....	Mar. 2, 11 a.m.....	Furn. 60,000 cu. yds. crushed limestone, 5,000 cu. yds. crushed granite.....	L. E. McGann, Comm. Pub. Wks.
Illinois.....	Morris.....	Mar. 2, 10 a.m.....	Pavg. one street with brick, another with asphaltic cement, concrete base; also concrete curb and gutter.....	F. D. Condon, City Clk.
Montana.....	Helena.....	Mar. 4.....	Constrn. 94,000 sq. ft. concrete walks, 2,500 lin. ft. concrete cross walks, 16,200 lin. ft. concrete curbs.....	Chas. W. Helmick, City Engr.
New Jersey....	Haddonfield....	Mar. 4.....	Constrn. macadam.....	C. O. Brown, Mayor.
Alabama....	Chatom....	Mar. 4, 4 p.m....	Constrn. 5 miles sand-clay road.....	W. S. Keller, State Highway Engr.
Indiana....	Newport....	Mar. 4, 10 a.m....	Constrn. 2 gravel roads.....	H. T. Payne, County Aud.
Ohio.....	Toledo.....	Mar. 4, noon.....	Pavg. with vitrified brick on concrete.....	F. G. Stockton, Sec'y.
Indiana.....	Frankfort.....	Mar. 4.....	Pavg. 8½ blocks with bitulithic creosote blocks, sheet asphalt or vitrified bricks.....	C. M. Conee, City Clk.
Indiana.....	Newcastle.....	Mar. 4.....	Pavg. with vitrified brick sheet asphalt, bitulithic or macadam, combination curb and gutter.....	L. M. Johnson, City Clk.
Missouri....	Hannibal....	Mar. 4, noon.....	Constrn. sidewalks.....	W. H. Youse, City Clk.
North Carolina	Murphy.....	Mar. 4, 2 p.m.....	Constrn. 68,000 cu. yds. grading, 1,200 ft. vitrified pipe, 550 cu. yds. masonry, 6,300 lbs. steel.....	W. H. Woodbury, Prs. H'way Com.
Indiana.....	Vevay.....	Mar. 4, 1 p.m.....	Constrn. 7 miles road; cost, \$16,000.....	County Comm.
Iowa.....	Grinnell.....	Mar. 4, 7:30 p.m.....	Constrn. cement and brick sidewalks for year.....	J. H. Patton, Mayor.
Minnesota....	Ortonville....	Mar. 4, 8 p.m.....	Constrn. cement sidewalks and crossings.....	C. E. Schofield, City Clk.
California....	Verona....	Mar. 5, 2:30 p.m....	Improving roads.....	J. T. Furlong, City Clk.
Indiana.....	Monticello....	Mar. 5, noon.....	Improving roads.....	A. G. Fisher, County Aud.
Indiana.....	Crawfordsville....	Mar. 5, 10 a.m....	Constrn. gravel roads.....	B. B. Engle, County Aud.
Indiana.....	Marion....	Mar. 5.....	Constrn. road.....	County Comm.
Indiana.....	Bedford....	Mar. 5, 1 p.m....	Constrn. 2 gravel and macadam roads.....	E. W. Edwards, County Aud.
Indiana.....	Brookville....	Mar. 5, 1 p.m....	Constrn. 2½ miles highway.....	C. G. Reifel, County Aud.
Michigan....	Houghton....	Mar. 5, noon.....	Constrn. 4 miles bit. macadam roads and 4½ miles macad.....	County. Comrs.
Indiana.....	Jasper.....	Mar. 5, 2 p.m....	Constrn. rock road in Columbia township.....	J. S. Seng, County Aud.
Texas.....	Beaumont....	Mar. 5, 10 a.m....	Constrn. 93,600 yds. pav't on concrete, any material; also 37,000 ft. concrete curb.....	
Florida.....	Ft. Pierce.....	Mar. 5.....	Constrn. 100,000 cu. yds. embkmt., 90,000 cu. yds. rock surf.	J. B. Sutton, City Sec'y.
Indiana.....	Vincennes....	Mar. 5.....	Constrn. 2 gravel roads.....	D. D. & C. M. Rogers, Daytona, Fla.
Indiana.....	Hartford City....	Mar. 5, 2 p.m....	Constrn. macadam roads.....	J. T. Scott, County Aud.
Missouri....	Kansas City....	Mar. 5, 2 p.m....	Constrn. sidewalks, laying asphalt and concrete pavements.....	Jas. Cronin, Jr., County Aud.
Washington....	Mt. Vernon....	Mar. 5, 1 p.m....	Constrn. mile of road.....	F. E. Purcell, Sec'y.
Missouri....	Columbia....	Mar. 5.....	Constrn. brick paving.....	J. M. Shields, County Aud.
Indiana.....	Jasper.....	Mar. 5, 2 p.m....	Constrn. free rock roads.....	J. R. Ellis, City Engr.
Indiana.....	Crown Point....	Mar. 6, noon.....	Constrn. 4 gravel roads.....	J. H. Seng, County Aud.
Indiana.....	Lafayette....	Mar. 6, 10 a.m....	Constrn. 2 gravel roads.....	C. A. Johnson, County Aud.
Iowa.....	Dubuque....	Mar. 6.....	Pavg. Jackson street with brick.....	G. W. Baxter, County Aud.
Iowa.....	Centerville....	Mar. 6, 2 p.m....	Constrn. 25,000 yds. paving, 12,000 ft. curb.....	C. H. Baumgartner, City Engr.
New Jersey...	Atlantic City....	Mar. 6, 11 a.m....	Pavg. Lengport drive.....	City Clerk; Hall & Adams, Engrs.
Iowa.....	Fairfield....	Mar. 6, 2 p.m....	Constrn. 25,000 yds. pav't, 12,000 ft. curb, 12,000 lbs. gut. plts.	E. D. Rightmire, County Engr.
Ohio.....	West Unity....	Mar. 7.....	Pavg. portions of 3 streets.....	City Clerk; Hall & Adams, Engrs., Centerville.
Indiana.....	Columbus....	Mar. 7, 10 a.m....	Constrn. gravel road.....	Henry Reifel, Village Clk.; George Champo, Engr., Toledo, O.
Indiana.....	Ft. Wayne....	Mar. 7, 7:30 p.m....	Constrn. cement sidewalks.....	County Comm.
Ohio.....	Youngstown....	Mar. 7, noon.....	Gradg. & draining Marshall street & constrn. sidewalks.....	F. T. Benoy, Chm. Bd. Pub. Wks.
Mississippi....	Vicksburg....	Mar. 8, noon.....	Constrn. gravel road.....	W. H. McMillin, Clk. Dir. Pub. Serv.
Florida....	Tallahassee....	Mar. 8, 10 a.m....	Laying cement walk in capitol grounds.....	J. D. Laughlin, Chanc. Clk.
Kentucky....	Tompkinsville....	Mar. 8.....	Constrn. 4 miles pike road.....	Secretary of State.
Wisconsin....	Neenah....	Mar. 9, 2 p.m....	Constrn. sheet asphalt, concrete or cement asphalt block, Sarcolithic, tar macadam or creosote block pavement.....	B. L. Bradshaw, Chair. Road. Com.
Ohio.....	Richwood....	Mar. 9, 2 p.m....	Grading, draining, curbing and paving street.....	J. P. Keating, Sec'y Bd. Pub. Wks.
Wisconsin....	Racine....	Mar. 9, 10 a.m....	Constrn. 11,000 sq. yds. pav't, 2,200 ft. concrete gutter, 2,700 ft. combined curb and gutter.....	Otto T. Boggs, Village Clk.
Ohio.....	Delaware....	Mar. 9, 1 p.m....	Constrn. number of roads.....	Board of Public Works.
Chile.....	Santiago....	Mar. 10, 10 a.m....	Constrn. 70,000 meters asphalt pavement.....	W. F. Whittier, County Surveyor.
Indiana.....	Indianapolis....	Mar. 11, 10 a.m....	Furn. 210 carloads of crushed stone and 40,000 gal. of tarvia binder or equal.....	City of Santiago.
Canada....	Westmount, Que.	Mar. 11.....	Pavg. Western avenue.....	
Indiana.....	Mt. Vernon....	Mar. 11, 2 p.m....	Constrn. gravel roads.....	
Mississippi....	West Point....	Mar. 12.....	Constrn. 91,555 sq. ft. novaculite macadam.....	
Louisiana....	Bastrop....	Mar. 12, noon.....	Constrn. number of miles of concrete walk.....	
Louisiana....	Shreveport....	Mar. 14, 11 a.m....	Constrn. 25 miles of road, macadamizing or graveling.....	
Florida.....	Jacksonville....	Mar. 15.....	Pavg. number of streets.....	
Illinois.....	Moline....	Mar. 15.....	Paving 2 streets; estimated cost, \$37,000.....	
New Jersey...	Elizabeth....	Mar. 15, 8:30 p.m....	Pavg. with brick, trap block and flagging several streets.....	
Ohio.....	Caldwell....	Mar. 15, noon.....	Pavg. Combs road.....	
Wisconsin....	Reloit....	Mar. 15, 2 p.m....	Improving 3 streets.....	
Colorado....	Colorado Spgs....	Mar. 15 (about)....	Curbg., parking, graveling and oiling road.....	
Minnesota....	St. Peter....	Mar. 16, 10 a.m....	Constrn. State road No. 1.....	
Missouri....	Columbia....	Mar. 19.....	Constrn. brick pavement.....	
Ohio.....	Bowling Green....	Mar. 19, 1 p.m....	Macadamizing 5 roads.....	
Ohio.....	Cleveland Heights....	Mar. 19.....	Pavg. Superior street with brick, asphalt or macadam.....	
Pennsylvania....	Oil City....	Mar. 25.....	Pavg. with vitrified brick or bituminous concrete 21,000 sq. yds. also 14,000 ft. curbing.....	
Ohio.....	Euclid....	Mar. 25, noon.....	Improving Euclid road.....	
Pennsylvania....	Lisbon....	Mar. 26.....	Constrn. concrete culverts.....	
Indiana.....	South Bend....	Apr. 1, 11 a.m....	Constrn. macadamized road, 3 miles.....	
Louisiana....	Shreveport....	April 1.....	Furn. 60,000 tons hard rock or gravel.....	Clarence Sedgewick, County Aud.
Indiana.....	South Bend....	Apr. 1.....	Impg. Edwardsburg road.....	J. T. Bullen, Parish Engineer.
Ohio.....	Oberlin....	Apr. 1.....	Constrn. 6,000 yds. brick pavement; cost, \$12,000.....	R. E. Keller, County Surveyor.
Hawaii....	Pearl Harbor....	Apr. 6, 11 a.m....	Constrn. 22,575 sq. yds. oil macadam.....	H. T. Marsh, City Clk.
Minnesota....	Winona....	Apr. 9.....	Constrn. 21 miles macadam road.....	Commandant Naval Sta., Wash'gton.
Illinois.....	Rochelle....	Apr. 30 (about)....	Pavg. with brick on concrete base; cost, \$85,000.....	Ios. Winzewski, County Aud.
				W. B. M. Henry, Mayor; Aetna Eng. Bureau, Chicago.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
SEWERAGE				
Iowa.....	Sioux City.....	Mar. 2, 10 a.m.....	Constrn. storm water sewers.....	E. J. Wells, City Clk.
Iowa.....	Knoxville.....	Mar. 4.....	Constrn. 10,500 ft. 8 & 10-in. clay pipe, sewers & appur.....	City Clerk; Hall & Adams, Engrs., Centerville, Ia.
Iowa.....	Grinnell.....	Mar. 4, 7 p.m.....	Furn. sewer pipe for year.....	J. H. Patton, Mayor.
Arkansas.....	Ft. Smith.....	Mar. 4, noon.....	Constrn. storm water sewers for Garrison ave.; cost, \$11,500	R. M. Johnston, Sec'y.
Alabama.....	Montgomery.....	Mar. 4.....	Installg. sewer system in Masonic Home.....	B. M. Jacobs, Chm.
Minnesota.....	Stillwater.....	Mar. 4.....	Constrn. 7,300 ft. 6 to 36-in. sewers.....	L. W. Clarke, City Engr.
Michigan.....	Lansing.....	Mar. 4.....	Constrn. 2,330 ft. brick sewer and 3,700 ft. pipe sewer.....	H. A. Sparks, City Engr.
Missouri.....	Macon.....	Mar. 4.....	Constrn. 7,166 ft. 10 to 20-in. pipe and appur.....	Bryan Hurst, City Clk.
Missouri.....	Union.....	Mar. 4.....	Constrn. 23,000 ft. 6 to 12-in. clay pipe sewer and appur.....	G. H. Bossbrink, City Clk.; Fuller Coul Co., St. Louis, Engrs.
Florida.....	Bradenton.....	Mar. 5.....	Constrn. 31,000 ft. 4 to 10-in. clay pipe, 2,600 ft. 8 to 10-in. c. i. pipe and appur.....	O. A. Spencer, Comm. Pub. Wks.
Indiana.....	Ft. Wayne.....	Mar. 7, 7.30 p.m.....	Constrn. a number of sewers.....	F. T. Benoy, Chm. Bd. Pub. Wks.
Oklahoma.....	Muskogee.....	Mar. 5, 10 a.m.....	Constrn. 8-in. clay pipe sewer.....	Chas. Wheeler, Jr., City Clk.
Ohio.....	Youngstown.....	Mar. 7, noon.....	Constrn. 2 sewers.....	W. H. McMillin, Clk. Dir Pub. Serv.
Canada.....	Branden, Man.....	Mar. 8.....	Furn. vitrified sewer pipe for year.....	R. E. Speakman, City Engr.
Canada.....	Westmount, Que.....	Mar. 11.....	Constrn. intercepting sewer on Western avenue.....	Arch. Currie, City Surv.
Indiana.....	Portland.....	Mar. 11.....	Constrn. sewers; cost, \$7,900.....	O. A. Clayton, City Engr.
New York.....	Rochester.....	Mar. 13, 11 a.m.....	Constrn. div. No. 8 and part of No. 7 outlet into the lake, consisting of 9,300 ft. of 66-in. pipe.....	X F. Piper, Sec'y Bd. Contract.
Tennessee.....	Jellico.....	Mar. 19.....	Constrn. 4.8 miles 8 to 12-in. pipe sewers and accessories.....	A. B. Mahan, Sec'y Sew'ge Comm.
Hawaii.....	Pearl Harbor.....	Mar. 30, 11 a.m.....	Constrn. sewer system Pearl Harbor.....	W. J. Kirkpatrick, Jackson, Miss.
Texas.....	Clarksville.....	April 1 (about).....	Constrn. 8 miles sewers, cost \$25,000.....	Navy Dept., Washington, D. C.
California.....	Covina.....	May 1.....	Constrn. sewer system; cost, \$45,000.....	J. R. Webb, City Clerk.
Illinois.....	Altamont.....	May 1.....	Constrn. sewer system.....	Town Clerk and F. G. Dessery, Eng., Los Angeles, Cal.
City Council.				
WATER SUPPLY				
Kentucky.....	Henderson.....	March 2.....	Furn. plans for filtration plant.....	W. I. Thompson, Mayor.
California.....	Orange.....	Mar. 4, 5 p.m.....	Furn. 32,000 ft. c. i. water pipe, spec'l's, hydrants, valves, etc.	C. W. Hallman, Clk.
Oklahoma.....	Pawhuska.....	Mar. 4, 5 p.m.....	Furn. 32,000 ft. 4 to 6-in. c. i. pipe, hydrants, valves, etc.	J. C. Ferguson, Mayor.
Porto Rico.....	Yauco.....	Mar. 4, 10 a.m.....	Constrn. water works.....	Franco. Catala, Mayor.
Missouri.....	Nevada.....	Mar. 4.....	Constrn. steel water tower; capacity, 100,000 gal.	Bd. Managers, State Hospital.
Texas.....	Sherman.....	Mar. 4.....	Furn. water pipes, valves, hydrants, etc.	L. H. McDuffey, Supt.
Illinois.....	Chicago.....	Mar. 5, 11 a.m.....	Furn. 61 double gate valves.....	L. E. McGann, Comm. Pub. Wks.
Illinois.....	Eerwyn.....	Mar. 5.....	Sinking 16-in. well.....	John Jaros, City Clk.
Illinois.....	Savannah.....	Mar. 5, 8 p.m.....	Re-constrn. water works.....	H. H. McKinney, Clk. Water Com.
New York.....	New York.....	Mar. 6, 2 p.m.....	Constrn. high pressure mains.....	H. S. Thompson, Water Comm.
Maryland.....	Baltimore.....	Mar. 6, 11 a.m.....	Constrn. mas'ry dam excav. 35,000 cu. yds., concr 38,000.	J. H. Preston, Pres. Bd. Awards.
Missouri.....	Kansas City.....	Mar. 6, 2 p.m.....	Furn. 2,242 tons c. i. water pipe.....	A. C. Wright, Purchasing Agent.
Canada.....	Winnipeg, Man.....	Mar. 7, 11 a.m.....	Furn. five 36 and three 20-in. gate valves.....	M. Peterson, Sec'y Bd. Control.
Indiana.....	Hartford City.....	Mar. 7.....	Installg. two 100-h.p. boilers.....	J. T. Trant, City Clk.
Canada.....	Brandon, Man.....	Mar. 8.....	Furn. water pipe & general water works supplies for year.	R. E. Speakman, Civ. Engr.
Br. Columbia.....	Edmonds.....	Mar. 11.....	Furn. 35 miles 3 to 10-in. steel pipe; cost, \$800,000.....	W. Griffiths, City Clk.
Washington.....	Rockford.....	Mar. 11, 7.30 p.m.....	Furn. iron water mains and accessories.....	C. W. McDowell, City Clk.
Br. Columbia.....	Burnaby.....	Mar. 11, 5 p.m.....	Constrn. about 170,000 lin. ft. c. i. water main.....	W. Griffiths, Clk. Bd. Pub. Wks.
New York....	West Point.....	Mar. 12.....	Extending distributing system.....	Maj. B. T. Clayton, Q. M.
Illinois.....	Chicago.....	Mar. 13.....	Furn. filters for schools.....	Board of Education.
Missouri.....	Mountain Grove.....	Mar. 15.....	Constrn. water works; cost, \$20,000.....	W. S. Candler, Mayor.
Ohio.....	Euclid.....	Mar. 25, noon.....	Constrn. water main.....	F. H. Shoaff, Clk.; Pearse Eng'g Co.
Illinois.....	Altamont.....	May 1.....	Constrn. water works and furn. hydrants, valves, c. i. pipe, pumps, tower and tank.....	City Council.
LIGHTING AND POWER				
Oklahoma.....	Afton.....	Mar. 4, noon.....	Furn. and installing 100-kw. engine and generator, centrifugal pump, boiler, switchboard, etc.....	I. T. Hess, Pres. Bd. Trus.; Goodwin & Harper, Scarritt Bldg., Kansas City Engrs.
Montana.....	Helena.....	Mar. 4.....	Furn. 127 1-lamp ornamental lamp posts.....	Chas. W. Helmick, City Engr.
Pennsylvania.....	Lancaster.....	Mar. 5.....	Installing two 250-h.p. boilers.....	J. H. Rathfon, City Compt.
New York.....	Saratoga Spgs.....	Mar. 5, 7.30 p.m.....	Lighting streets for 4 years.....	Clarence Bird, Clk. Street Comm.
Indiana.....	Petersburg.....	Mar. 7.....	Lightg. streets and furn. electricity to citizens.....	City Clerk.
Minnesota.....	Biwabik.....	Mar. 9.....	Instaling ornamental lighting; 36 posts.....	J. E. Reilly, Village Clk.
Georgia.....	Atlanta.....	Mar. 11, 10 a.m.....	Furn. report & plans for lighting & power for city.....	J. E. McClelland, Chm. Light. Com.
Canada.....	Winnipeg, Man.....	Mar. 25.....	Furn. cables for fire and electric system.....	M. Peterson, Sec'y Bd. of Control.
Canada.....	Edmonton, Alta.....	Mar. 31.....	Improving lighting plant; cost, \$200,000.....	J. C. Huffman, Supt. of Plant.
FIRE EQUIPMENT				
Minnesota.....	Duluth.....	Mar. 1, 3 p.m.....	Furn. 4-cyl. 40-h.p. chief's car; maximum cost, \$4,500.....	Fire Commissioners.
Dist. Columbia.....	Washington.....	Mar. 2, 11 a.m.....	Constrn. fire station, Newport, R. I.....	Bureau Yds. & Docks, Navy Dept.
Rhode Island.....	Newport.....	Mar. 2, 11 a.m.....	Bldg. fire station for hook and ladder and hose reels.....	Navy Dept., Washington.
Illinois.....	Moline.....	Mar. 4.....	Furn. auto fire truck.....	City Clk.
Mississippi.....	Vicksburg.....	Mar. 4, 8 p.m.....	Furn. 2,500 ft. 2½-in. hose.....	J. J. Hays, Mayor.
Michigan.....	Iron River.....	Mar. 7, 7 p.m.....	Furn. combination chemical hose wagon.....	J. B. Henley, Village Clk.
New Jersey.....	Vetnor City.....	Mar. 6, 8 p.m.....	Alterg. fire house, also furn. motor tractor for fire apparatus.....	E. S. Royal, City Clk.
New Jersey.....	Jersey City.....	Mar. 7, 8 p.m.....	Furn. 5 fire escapes.....	W. O'Mara, Clk.
Ohio.....	Ottawa.....	Mar. 9, noon.....	Furn. chemical wagon with two 25-gal. tanks.....	H. C. Herding, Village Clk.
New Jersey.....	Atlantic City.....	Mar. 11, 8 p.m.....	Erecting fire house.....	W. S. Culbertson, Chm. Fire Com.
Illinois.....	Chicago.....	Mar. 20, noon.....	Furn. 35,000 ft. 1-in. rubber hose.....	J. F. Neil, Sec'y So. Pk. Comm.
BRIDGES				
Ohio.....	Tippin.....	Mar. 2, 1.30 p.m.....	Constrn. creosoted wood plank floor.....	J. H. Lemartz, County Aud.
Minnesota.....	Warren.....	Mar. 2, 4 p.m.....	Constrn. 12 steel bridges.....	A. G. Lundgran, County Aud.
Indiana.....	Rockport.....	Mar. 2, 2 p.m.....	Constrn. 39 bridges.....	J. T. Stevenson, County Aud.
Washington.....	Chehalis.....	Mar. 4.....	Constrn. 20-ft. reinforced concrete culvert.....	H. H. Swofford, County Aud.
Texas.....	Ft. Worth.....	Mar. 4.....	Constrn. 2 reinforced concr. bridges; cost, \$250,000.....	C. J. McKenna, County Aud.
New York.....	Puffalo.....	Mar. 4, 2 p.m.....	Constrn. bridge of concrete or iron.....	George Staub, Town Supt.
Oklahoma.....	Pawhuska.....	Mar. 4.....	Furn. 25,000 ft. No. 6 copper wire, 130 poles, 33 200-c.p. tungsten lights, transformer, etc.	C. Ferguson, Mayor.
Minnesota.....	Vermillion.....	Mar. 4, 10 a.m.....	Constrn. steel bridge.....	T. A. Hoffman, County Aud.
Pennsylvania.....	Wilkes-Barre.....	Mar. 4.....	Repairing bridge.....	F. H. Gates, City Clk.
New York.....	Lancaster.....	Mar. 4, 2 p.m.....	Constrn. bridge over Cayuga Creek.....	G. C. Diehl, Supt. Highways.
Idaho.....	Twin Falls.....	Mar. 4.....	Constrn. covering over irrigation ditch; cost, \$4,300.....	S. H. Taylor, City Clk.
Indiana.....	Salem.....	Mar. 4.....	Constrn. concrete bridge and fill.....	F. S. Munkeit, County Aud.
Missouri.....	Kansas City.....	Mar. 5.....	Constrn. reinforced concrete bridge; cost, \$12,000.....	E. E. Pursell, Sec'y Bd. Pub. Wks.; Waddell & Harrington, Engrs.
Nebraska.....	McCook.....	Mar. 5.....	Constrn. substruc., superstruc., & aprch. for brdg. during yr.	C. K. Dutcher, County Clk.
Tennessee.....	Chattanooga.....	Mar. 5, 10 a.m.....	Reflooding Tennessee River bridge.....	G. R. Brown, Chm. Road Comm.
Ohio.....	Van Wert.....	Mar. 5, 1 p.m.....	Constrn. 5 bridges.....	Clarence Kohn, County Aud.
Illinois.....	Danville.....	Mar. 5.....	Constrn. bridge, concrete floor and abutments.....	Bridge Comm. Supervisors.
Ohio.....	Coshocton.....	Mar. 5, 10 a.m.....	Constrn. and repairing bridge.....	F. Mowrey, County Aud.
Ohio.....	Columbus.....	Mar. 5.....	Constrn. masonry approaches for viaduct.....	S. A. Kinear, Dir. Pub. Serv.
Indiana.....	Winamac.....	Mar. 5.....	Constrn. 5 bridges and 1 mile of road.....	C. E. Paul, County Surv.
Nebraska.....	Fairbury.....	Mar. 6.....	Constrn. substruc., superstruc. for brdg. & aprchs for year.	C. H. Schaffer, County Clk.
Illinois.....	Peoria.....	Mar. 6, 8 p.m.....	Constrn. 80-ft. riveted steel truss bridge.....	Driveway and Park District.
Missouri.....	Carthage.....	Mar. 7, 2 p.m.....	Constrn. 3 bridges.....	Wm. Kohlman, Highway Engr.
South Dakota.....	Sioux Falls.....	Mar. 8, 2 p.m.....	Constrn. bridges during 1912.....	Henry Howe, County Aud.
Indiana.....	Richmond.....	Mar. 9.....	Constrn. 5 reinforced concrete bridges.....	L. Bowman, County Aud.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
BRIDGES—(Continued).				
Tennessee.....	Elizabethton.....	Mar. 11, noon.....	Furn. & constrn. iron or steel brdg. across Doe River, incl. piers	S. B. Wood, Chm., Bridge Com.
Ohio.....	Salem.....	Mar. 11.....	Constrn. steel bridge and approaches.....	H. C. McCammon, Pres. Co. Comm.
Tennessee.....	Roan Mtn.....	Mar. 11.....	Constrn. bridge across Doe River.....	S. B. Wood, Chm., Bridge Comm.
Ohio.....	Delaware.....	Mar. 11, noon.....	Constrn. superstructure.....	W. H. Bodurtha, County Aud.
South Dakota.....	Brookings.....	Mar. 12, 3 p.m.....	Constrn. bridge repair work for year.....	O. J. Ottiness, County Aud.
Nebraska.....	Loup City.....	Mar. 12.....	Constrn. bridges for 1912; one bridge to cost \$14,000.....	W. C. Dietrichs, County Clk.
Pennsylvania.....	Norristown.....	Mar. 12, noon.....	Removg. old bridge and building new.....	R. C. Miller, County Clk.
Canada.....	Edmonton.....	Mar. 15.....	Furn. steel highway bridges during 1912.....	John Stocks, Dep. Min. Pub. Wks.
Illinois.....	Maywood.....	Apr. 15 (about).....	Constrn. concrete bridge; cost, \$35,000.....	Westcott & Ronneberg, Engs., Chicago.
Illinois.....	Waukegan.....	Mar. 20.....	Constrn. conc. highway bridge, 490 ft. long; cost, \$74,000.....	I. J. Dietmeyer, Comm. Pub. Wks.
Florida.....	Jacksonville.....	Mar. 29.....	Constrn. 1 concrete and 2 wooden bridges.....	C. W. Ellis, Chm., County Comm.
Indiana.....	Bluffton.....	Apr. 1 (about).....	Constrn. 8 concrete bridges and box culvert.....	L. A. Williamson, County Aud.
Minnesota.....	Winona.....	Apr. 9.....	Constrn. 80-ft. steel truss bridge.....	County Auditor.
Illinois.....	Maywood.....	Apr. 15.....	Constrn. concrete bridge; cost, \$35,000.....	City Clerk.
MISCELLANEOUS				
Florida.....	Sumterville.....	Mar. 4, noon.....	Erectg. jail at Bushnell.....	G. Nelson, Clk. and Aud.
Dist. of Col.....	Washington.....	Mar. 5.....	Furn. various kinds of rubber hose.....	Bureau of Navy Dept.
Ohio.....	Columbus.....	Mar. 6, 1 p.m.....	Constrn. miscellaneous bldgs., etc., at State farm.....	State Bd. of Agriculture.
New Jersey.....	Camden.....	Mar. 6, 8 p.m.....	Collecting and removing garbage and ashes.....	R. J. Shelhamer, Chm. Comm.
Indiana.....	Woodruff Place.....	Mar. 11, 8 p.m.....	Removg. ashes and garbage.....	C. E. Swain, Town Clk.
Texas.....	Vernon.....	Mar. 12.....	Bldg. brick jail.....	J. A. Naehers, County Judge.
Pennsylvania.....	Huntington.....	Mar. 15.....	Furn. 2,000 chestnut poles for transmission line.....	Raystown Water Power Co.

STREET IMPROVEMENTS

Red Bay, Ala.—After long and stubborn contest Red Bay won \$8,000 State donation to be used by State Highway Commission in constructing model public road in Franklin County.

Los Angeles, Cal.—Final plans and specifications for improvement of J st. in Wilmington and opening of road around west basin to Palos Verdes st. in San Pedro have been approved and Board of Public Works will be asked to advertise for bids.

Los Angeles, Cal.—Plans for opening of Griffin ave. north from Avenue 43 through Hermon to South Pasadena and Pasadena now are in hands of Streets and Boulevards Committee of City Council, and will be taken up again shortly.

San Jose, Cal.—Report of Paving Committee advocating immediate improvement of main arteries of travel leading into city has been adopted.

South Pasadena, Cal.—At special meeting of Board of Trustees it was decided and ordered that Huntington drive should be paved from Alhambra rd. to Garfield ave. This involves an expenditure of \$80,000 and is one of most important steps taken by South Pasadena.

South Pasadena, Cal.—City Trustees have adopted resolution for grading and paving of Huntington drives.

Lisbon, Conn.—Appropriation of \$10,000 has been made for construction of roads.

New Britain, Conn.—Board of Public Works has recommended that Common Council award contract for paving with sheet asphalt Arch st., from Main and Kensington sts., to Southern New England Paving Co., of Hartford, at \$2.35 per sq. yd.

Spring Hill, Conn.—Sum of \$20,000 has been voted towards highway improvements.

Wilmington, Del.—Street and Sewer Department is making preparations to begin work of laying new street pavement. Department expects to pave about 175,000 sq. yds. of streets.

St. Augustine, Fla.—Ordinance for paving of Central ave. with vitrified brick has passed first reading.

St. Augustine, Fla.—Council has decided to have new ordinance drawn for paving of Saragossa st. so as to allow calling for bids for lake asphalt or any asphalt equally good.

St. Augustine, Fla.—Ordinance has passed providing for paving of Central ave. with brick, and brick filled in with asphalt.

West Palm Beach, Fla.—Construction of ocean boulevard to run from Lake Worth Inlet, 7 miles north of Palm Beach, to Delray, 18 miles south, making about 25 miles of oceanside drive, has been authorized.

Atlanta, Ga.—Regrading of Ivy st. is being considered.

Dalton, Ga.—City Council has appointed committee to investigate cost of grading all sidewalks within city limits.

Ottawa, Ill.—Plans are being considered for paving improvement in South Ottawa; estimated cost, \$200,000; and in West Ottawa to cost \$160,000; also completion of improvements of Ottawa bridge approaches, including paving, to cost \$7,000.

Indianapolis, Ind.—Petition has been filed with Board of Public Works for permanent improvement of E. New York

st. from Belt railroad tracks to Emerson ave., distance of about 1½ miles.

Marshalltown, Ia.—City Council is making preparations to do considerable paving, and preliminary arrangements are being perfected toward advertising for bids on work. Schedule prepared outlines 33 blocks in which work will be done. It is likely that paving will be of concrete.

Muncie, Ind.—City Engineer Deardorff has submitted estimates on following proposed improvements: For paving of roadway in Ohio ave., from Main to Washington st., \$1,205.38; for paving of roadway in Charles st., from High to Liberty, \$3,821.43.

Clinton, Ia.—City Engineer has prepared estimates for grading, curbing, paving and guttering of Fifth ave., from Second to Fifth sts., as follows: With sheet asphalt paving, and vitrified block gutters and track lines, and guttering on Fifth ave., from Second to Fifth sts., as follows: 12,934 sq. yds. grading, at 20 cents, \$2,586.80; 9,830 sq. yds. asphalt paving, at \$2.95, \$28,998.50; 3,104 sq. yds. vitrified block paving, at \$2.12, \$6,580.48; 1,250 lin. ft. pillar curb, at 85 cents, \$1,062.50; 2,506 lin. ft. plain curb, at 60 cents, \$1,503.60; two catch basins, at \$35, \$70; 200 ft. 10-in. catch basin pipe, at 40 cents, \$80; adjusting adjacent paving, \$80; engineering, printing, notices, etc., \$1,600; total estimated cost of improvement, \$42,561.88. Of above city's share will be \$8,542.53, leaving balance of \$34,019.35 to be assessed against abutting property owners.

Newark, N. J.—Cost of grading, curbing, paving with vitrified block paving, and guttering, as follows: 12,895 sq. yds. grading, at 20 cents, \$2,579.12; 12,895 sq. yds. wood block paving, at \$2.45, \$31,592.75; 1,250 lin. ft. pillar curb, at 85 cents, \$1,062.50; 2,506 lin. ft. combined curb and gutter, at 70 cents, \$1,754.20; 194 lin. ft. gutter only, at 40 cents, \$77.60; two catch basins, at \$35, \$70; 200 lin. ft. 10-in. catch basin pipe, at 40 cents, \$80; adjusting adjacent paving, \$80; engineering, printing, notices, etc., \$1,600; total estimated cost of improvement, \$38,896.05. Of above city's share will be \$7,675, leaving balance of \$31,221.05 to be assessed against abutting property owners.

St. Paul, Minn.—Cost of grading, curbing, paving with vitrified block paving, and guttering, as follows: 12,895 sq. yds. grading, at 20 cents, \$2,579.12; 12,985 sq. yds. vitrified paving, at \$2.10, \$27,079.50; 1,250 lin. ft. pillar curb at 85 cents, \$1,062.50; 2,506 lin. ft. combined curb and gutter, at 70 cents, \$1,754.20; 194 lin. ft. gutter only, at 40 cents, \$77.60; two catch basins, at \$35, \$70; 200 lin. ft. 10-in. catch basin pipe, at 40 cents, \$80; adjusting adjacent paving, \$80; engineering, printing, notices, etc., \$1,600; total estimated cost of improvement, \$34,382.80.

Elizabeth, N. J.—Cost of grading, curbing, paving with vitrified block paving, and guttering, as follows: 12,934 sq. yds. grading, at 20 cents, \$2,586.80; 12,934 sq. yds. concrete paving, at \$1.70, \$21,987.80; 1,250 lin. ft. pillar curb, at 85 cents, \$1,062.50; 2,506 lin. ft. plain curb, at 60 cents, \$1,503.60; two catch basins, at \$35, \$70; 200 lin. ft. 10-in. catch basin pipe, at 40 cents, \$80; adjusting adjacent paving, \$80; engineering, printing, notices, etc., \$1,600; total estimated cost of improvement, \$28,970.70.

Of above city's share will be \$6,462.30, leaving balance of \$22,508.40 to be assessed against abutting property owners.

Fort Scott, Kan.—Ordinance has been passed authorizing issuance of \$13,570 bonds for grading, paving and curbing of Main st.

Lexington, Ky.—Purchase of new street flusher, of latest improved model, is being considered.

Crowley, La.—Council has ordered City Attorney to draw up paving ordinance providing for covering of Parkerston ave., distance of seven blocks, with first-class paving material, to be selected.

Springfield, Mass.—Street Department is contemplating Birnie ave. extension.

Boston, Mass.—Plans are being prepared for extension and widening of Chestnut st.; estimated cost, \$30,000.

New Bedford, Mass.—Widening of Purchase st. is being discussed.

Detroit, Mich.—Department Public Works Commissioner Haaren sent to Common Council recommendations for paving of streets under forced paving clause and by petition amounting to estimated total cost of \$261,027.

Duluth, Minn.—Petition has been received for improvement of 4th alley, between 21st and 22d aves. east.

Duluth, Minn.—Improvement of 9th st. between 7th ave. east and Cascade Park has been ordered.

Duluth, Minn.—City Engineer has been directed to prepare survey and estimates of cost of grading and improving 4th ave. east from Mesaba ave. to north line of Third division, thence northwest along Brewery Creek to connection with Swan Lake rd., to width of 28 ft. Engineer estimated that it will cost \$2,063.60 to build culvert and gravel Swan Lake rd. from 15th st. near 2d ave. east to gravel pit. Another estimate placed cost of grading right-of-way from 3d ave. east and Mesaba ave. to 15th st. and thence to Swan Lake rd. at \$4,174.50. On latter Board of Public Works was directed to advertise for bids.

St. Paul, Minn.—Bids on curbing of Portland ave. have been rejected as too high.

St. Paul, Minn.—Board of Public Works has reported favorably on widening of Robert st. from 8th st. to Central ave.

Carthage, Mo.—City Council has adopted plans for paving 4th st. from Lyon to Howard sts., and Main st., from 2d to 5th sts.

Portland, Me.—Governor Frederick W. Plaisted has practically endorsed proposition for \$2,000,000 bond issue by State to build roads.

St. Joseph, Mo.—Ordinance has been introduced providing for extension of Noyes blvd. to Bartlett Park.

St. Joseph, Mo.—Various street improvements have been planned.

Dundee, Neb.—Trustees of village of Dundee are advertising for bids for construction of 2½ miles of paving to pave streets between Webster, Nicholas and 50th and 52d. Petitions are nearly unanimous. Cost of paving, guttering and curbing planned will aggregate \$100,-000.

Elizabeth, N. J.—Paving of Broad st. is being discussed.

Long Branch, N. J.—State Road Commissioners have agreed to furnish \$9,000 for completion of Water Witch Road, first section of 127-mile highway to be constructed.

Millville, N. J.—Proposition to improve Tuckahoe rd. has been placed before Cumberland County Board of Freeholders.

Paterson, N. J.—Bids will shortly be required on extensive improvements of numerous streets of city. Commissioners will decide on material when bids are received.

Perth Amboy, N. J.—Petition is being considered for asphalt block or vitrified brick pavement on New Brunswick ave.

Trenton, N. J.—Fifteenth st., between Avenue C and Boulevard, will be improved by laying down asphalt pavement.

Albany, N. Y.—State Highway Commission is planning to start work on 1,800 miles of good roads, both State and County, at approximate cost of \$22,000,000.

Brooklyn, N. Y.—One of first improvements to be made by Highway Bureau will be on College Point causeway.

Lockport, N. Y.—Aldermen are in favor of brick paving on Locust st.

Lockport, N. Y.—Petition has been presented asking for grading and paving of Church st., from Niagara st. to Hill st., with first quality of brick block.

Lockport, N. Y.—Resolution has been adopted for improvement of East High st. for distance of 2,200 ft.

Mohawk, N. Y.—Special election will be held to decide whether Main st. shall be paved. Estimated cost of paving is \$10,000, the cost to pay \$42,400, U. & M. V. Railroad Co., \$13,600, leaving but \$14,000 for village to raise by bonds.

Newburgh, N. Y.—Street Committee has decided to recommend to City Council purchase of steam traction roller, two-horse street sweeper and two teams of horses for city stables, and 300 cu. yds. of cracked stone for filling in of holes now existing in streets in various parts of city.

Syracuse, N. Y.—Improvement of Burnet ave., is being discussed.

Syracuse, N. Y.—Petition is being circulated in West Onondaga st. for paving of that thoroughfare from end of present pavement at South Geddes st. to Kandace st., present terminus.

Yonkers, N. Y.—Laying out and opening of St. James Terrace and Ludlow st. extension, Pier st. and West Cross st. have been approved.

Yonkers, N. Y.—Ordinance has been passed for laying out, opening and extending of Elm st., from Alder to Prescott st. Joseph F. O'Brien is City Clerk.

Cincinnati, O.—Ordinance bonds \$25,000 are being considered for opening, widening and extending Quebec rd., from Queen City to Glenway, from 30 to 60 ft.

Cincinnati, O.—Councilman White has drawn up motion calling upon City Engineer to prepare approximate estimate of straightening Ludow ave., from Cornell ave. to canal bridge.

Cleveland, O.—Wade Park ave. will be extended from its present westerly terminus at E. 65th st. to E. 55th st.

Columbus, O.—Good roads proposal, which provided for issuance of \$50,000,000 under State aid plans for construction of inter-county wagon roads, has passed constitutional convention.

Dayton, O.—Bids will be received until 12 noon, March 5, at office of City Auditor, for purchase of \$11,500 worth of bonds for paving Herman ave.; \$8,000 for repair of macadam on Linden and Central aves.; \$11,000 for paving Summit st.; \$22,500 for paving Troy st.; \$4,400 for opening and extension of Coate ave.; \$5,700 for paving street intersections on Clover st., and \$8,200 for widening of third alley south of 5th st. G. W. Bish, Auditor.

Youngstown, O.—City Council has adopted resolutions to sidewalk various city streets.

Youngstown, O.—Ordinance has been passed for paving of Garland, Earle, Woodward and New York aves.; also for grading, widening and paving of Ridge ave. and various other streets.

Harrisburg, Pa.—State Highway Department will shortly commence 40-ft. wide highway from city limits to Fort Hunter.

Harrisburg, Pa.—Ordinance has been passed for paving and curbing of Miller st., from 17th to 18th s.s.; also of Howard st., from Forrest to Woodbine st.

Lower Providence, Pa.—Taxpayers of Lower Providence Township have approved plans of Road Supervisors to purchase stone crushing outfit for \$2,500.

Burns, Tenn.—Issuance of \$100,000 in bonds for building of good roads in Dickson County is being discussed.

Knoxville, Tenn.—Appropriation is under consideration for opening of Jackson ave.

Dallas, Tex.—Improvement of Lemmon ave., from Oak Lawn to Throckmorton, has been ordered.

Dallas, Tex.—Arrangements have been made by which Parry ave. is to be made 100 ft. in width, preparatory to being paved with asphalt macadam.

Dallas, Tex.—Street Commissioner J. E. Lee will recommend to Board of Municipal Commissioners that Texas Bituminous Co. be awarded contract for paving Walton st., at price of approximately \$1,600.

Dallas, Tex.—Upon recommendation of County Engineer J. F. Witt, County Commissioners have ordered bids called for improving of four cardinal and eight secondary roads. Amounts suggested by County Engineer for improving of several sections are as follows: Cardinal Roads—West Dallas pike, \$35,169; Preston rd. to the north, \$22,700; Eastern pike, \$29,185; Lancaster pike to the south, \$22,093. Secondary Roads—Coppell rd., \$35,649; Seagoville rd., \$30,659; Cedar Hill rd., \$32,799; Denton rd., \$26,203; Richardson rd., \$19,680; Miller's Ferry rd., \$37,216; Garland rd., \$35,953. Of cardinal and secondary roads there are approximately 234 miles of paving. Improvements look to adding of 186 miles, making 420 miles of permanent paving with connecting roads. Bids were ordered by Court for paving or making of connecting roads from Lancaster to Cedar Hill, from Grand Prairie to Sowers, from Grand Prairie to Cedar Hill and on Davis st. rd.

El Paso, Tex.—Paving of Montana st., between Colton and Piedras sts., has been authorized.

El Paso, Tex.—El Paso may soon own paving plant with which city paving may be done. It is reported that Mayor C. E. Kelly is considering purchase of such plant with which to do city's paving work and may recommend it to City Council at session soon.

El Paso, Tex.—Property owners have petitioned that contract for paving Arizona st. be awarded to Texas Bituminous Co., at \$1 per sq. yd. Petition has been referred to Finance Committee.

Fort Worth, Tex.—Creosoted wood block paving is being considered for Houston st.

Galveston, Tex.—Bids for furnishing 15,000 yds. of shell for mainland roads have been rejected as too high, and new bids are invited.

Sherman, Tex.—Grayson County Commissioners will order issuance of bonds in sum of \$400,000 for purpose of building good roads in Sherman district.

Taylor, Tex.—City Council has adopted resolution calling election of taxpayers for March 19 to submit proposition of issuing \$25,000 of bonds for street paving in business section of city.

Taylor, Tex.—At regular adjourned session of City Council of Taylor resolution was passed calling election of taxpayers for March 19, to submit to people of Taylor proposition of issuing bonds in sum of \$25,000 for street paving in business section of city.

American Fork, Utah—American Fork is to have over five miles more of cement sidewalk paving if present plans are carried out. Ordinance has been passed by City Council creating paving district No. 1, which calls for paving of 793 lin. ft. 12 ft. wide; 660 ft. nine feet wide, and 28,114 ft. of 5-ft. pavement. Estimated cost of improvement is \$18,770.70.

Bristol, Va.—Chairman W. D. Lyon is advertising for sale pike road bond issue of \$100,000 in Sullivan County, Tenn., which includes part of Bristol. Bids will be opened March 11.

Lynchburg, Va.—Appropriation of \$450,000 from proceeds of bond issue will be used for streets improvements.

Richmond, Va.—Appropriation of \$3,600 to acquire Lumpkin property to complete Washington Square has been authorized.

Seattle, Wash.—Plans have been approved for grading of Genesee st.; estimated cost, \$68,784.

Neenah, Wis.—City will spend about \$60,000 in paving East Wisconsin ave. and Park Row this summer.

CONTRACTS AWARDED

Bessemer, Ala.—By Jefferson County Board of Revenue, to Wright & Crowder, o^r Birmingham, to construct road from near Wilkes to near Rutledge's Springs.

Helena, Ark.—By District No. 6, to Roche & Manigan Paving Co., Memphis, Tenn., for construction of 20,000 sq. yds. brick paving; cost, \$60,000.

San Francisco, Cal.—By Board, for paving California st., from Battery to Front sts., including crossing of Front st. to Fay Improvement Co., for \$3,760.19.

West Palm Beach, Fla.—By City, for construction of northern end of ocean blvd., to Col. Samuel Goodman, of Philadelphia, at \$10,000.

Rome, Ga.—By Board of Public Works

for paving East First st., from Third to First ave., with wood block, to Jameson & Hollowell, at \$2.03 per sq. yd.; also First ave., from Broad to East st. and Third ave., from Broad to East st.; total contract, \$17,959. For paving Third ave. and E. Third st., with asphalt, to Southern Asphalt & Construction Co., of Birmingham, at \$1.35 per sq. yd. Total contract, \$13,893.

Waycross, Ga.—By City Council, for about 50,000 sq. yds. of sidewalk paving, to J. P. Brandewie & Co., of Birmingham, Ala., at 80 cents per sq. yd.

Highland, Ill.—By Illinois Highway Commission, for improving the Trenton Macadam rd., to St. Clair Construction & Engineering Co., of East St. Louis, Ill.

Evansville, Ind.—By Road Commissioners, for construction of Heisch rd. in Knight Township, to R. W. Martin, at \$6,700. and Oimstead rd. at \$9,900.

Indianapolis, Ind.—For construction of roads, as follows: Macadam road in Deer Creek Township, to James F. Pierce, Delphi, at \$13,900; a gravel road in Burlington Township, to Beal & Bell, Logansport, at \$13,230; a gravel road in Jefferson Township, to Holoway & Misner, Monticello, at \$3,600; gravel roads in Warren County have been awarded to W. O. Thomas, Pine Village, at \$6,760, and Greenup & Co., Ambia, at \$10,850; for a gravel road in Monroe Township, to C. J. Seigmann, Henryville, at \$4,280.

Jefferson, Ind.—By Board of Commissioners of Clark County, to C. J. Sigmon, Henryville, Ind., at \$4,281.02, for construction of gravel road in Monroe Township.

Kentland, Ind.—By Board of Commissioners of Newton County, to Alva E. Herriman, Brook, Ind., at \$12,981.10, for construction of Geo. H. Hillis macadam road.

Laporte, Ind.—To F. G. Proudfoot, 1614 Unity Bldg., Chicago, at about \$40,000, for construction of 20,000 sq. yds. asphaltic concrete pavement.

Rensselaer, Ind.—By Board of Commissioners of Jasper County, to Charles Kain, Medaryville, Ind., at \$25,999, for construction of H. W. Marble macadam road.

Eldora, Ia.—By City, for 22 blocks of concrete paving, to J. S. McLaughlin & Sons, of Red Oak, Ia., at \$1.23 per yd., and 35 cents for curbing.

Vineville, La.—For paving Main st. with gravel, from river to National Cemetery, to Steward & McGinnis.

Baltimore, Md.—By Board of Awards, for paving, as follows: Contract 9, David M. Andrews Co., \$20,617.50. Contract 10, David M. Andrews Co., \$47,388.97. Contract 11, N. A. Middleton & Co., \$17,328.57. Contract 12, N. A. Middleton & Co., \$25,001.55. Contract 13, Cunningham Paving & Construction Co., \$28,746.02. Three asphalt contracts included in big paving job will not be awarded until next meeting of Board.

St. Paul, Minn.—By Board of Public Works, to St Paul Tile Works, for construction of 150,000 sq. ft. of cement sidewalk, at 8½ cents per sq. ft.; also to D. W. Moore, for grading Edmund st., at \$1,393.

Jackson, Miss.—By County Commissioners of Hinds County, to S. A. Gracco, Mt. Vernon, Ind., at \$7,732, for construction of eight miles of Jackson-Terry sand-clay road.

Jersey City, N. J.—By joint bridge committees of Essex and Hudson Board of Freeholders, for replanking Plank rd., to Trexler Lumber Co., of New York. Bids called for work in two sections. Their bids on first section was \$11,459, and on other section, \$6,950. Total of \$18,409, for work which it was originally estimated would not cost more than \$9,000. Contracts have now to be approved by Supervisors and Freeholders of both counties. Other bidders were McClave Son, \$14,485 and \$7,895, respectively; G. Mullins, \$19,950, and William Baker, \$12,400.

Albany, N. Y.—By Board of Contract & Supply, for cleaning of streets, to John C. Wasserbach, at \$10,250.

Auburn, N. Y.—By City, for paving E. Genesee st., from Hoopes ave. to Hunter ave., with Bessemer brick, to Tyne & Wiley, of Binghamton, at \$26,077.29; Brayer Bros., of Auburn, bid \$26,861.65, and James C. Dempsey, of Syracuse, bid \$27,628.61.

Rochester, N. Y.—By Board of Contract, for paving with asphalt Ridge-way ave., to Rochester Vulcanite Pavement Co., at \$48,122.

Charlotte, N. C.—By City, to Shuman & Shell, at \$2,400, to grade E. 9th st., and to Johnson, Porter & Peck, at \$1,327, for pipe and culvert work.

Harrisburg, Pa.—By City, for paving

of 13th st., from Herr st. to Sassafrass st., to E. E. Feist.

Philadelphia, Pa.—By City, for repaving Arch st. with wood blocks, from Front to 21st sts., to McNicol Paving & Construction Co., at \$2.87 per sq. yd., or total of \$119,897.50. Next lowest bidder was Edwin H. Vare, at \$2.89 per sq. yd.

Orangeburg, S. C.—By City, to Clayton Bergmans and J. C. Fairey, of Orangeburg, at \$15,555.85, for vitrified brick paving on E. Russell and S. Broughton sts.

Johnson City, Tenn.—By City Council, to Cleveland Trinidad Paving Co., to lay one quarter of a mile of street paving, in District No. 9, on West Maine ave., at cost of \$12,036.

Jonesboro, Tenn.—By Washington County Pike Commissioners, for building of link through Washington County for Bristol-to-Memphis highway, to Pid Stokes, of Greeneville, at following prices: For moving dirt, 21½ cents per sq. yd.; for macadam, \$1.55 per sq. yd.; for excavating stone, 47 cents per sq. yd.

Dallas, Tex.—By City, to J. A. Gregory, for paving of Jackson st., from Jefferson to Houston.

Dallas, Tex.—By Board of Municipal Commissioners, for paving of Walton st., to Texas Bitulithic Co., at \$1,388.34.

Galveston, Tex.—By County Commissioners, for construction of county road near Sweetwater Lake, to Hanson Bros., at \$27,510. F. Freund's bid was \$36,748.

Galveston, Tex.—By City, to Kelso & Vautrin, of Galveston, to construct vitrified brick pavement in alleys between Avenues A and E, from 20th to 25th sts. A. T. Dickey, City Engineer, has estimated amount of contract at \$19,064.15.

Kingsville, Tex.—By City, for building 15,000 ft. of sidewalks in Riviera, six miles below Kingsville, to C. A. McCracken.

Paris, Tex.—By City, to Western Paving Co., Oklahoma City, Okla., at \$30,760, to pave N. Main st., and to J. A. Gregory, at \$8,487, to pave Washington st.

Graham, Va.—By Tazewell County Supervisors, to Chandler & Co. and Hart & Hall, of North Carolina, to construct and improve Graham streets and roads; contract covers 5½ miles of road work.

West Allis, Wis.—By City, for paving National ave., from 53d to 75th sts., with tar macadam, to White Construction Co., Milwaukee, at \$19,831.

SEWERAGE

Ozark, Ala.—Sanitary sewerage bonds in sum of \$15,000 have been sold to Farnan Son & Co., of Chicago.

Cifax, Cal.—Town is considering change of sewer system to comply with provisions of State Board of Health.

Venice, Cal.—Another bond election will be held on April 4, for voting on \$43,000 bond issue for sewer and garbage system.

New Britain, Conn.—Bids will be received by Board of Public Works on sewer pipe, manhole covers and sewer trap elbow for year.

St. Augustine, Fla.—City Council is considering petition for permission to lay sewer along Cincinnati ave. to run into San Sebastian River.

Macon, Ga.—Bids for placing of sewers in territory which is to be provided with water mains in short while, will be advertised for by Sewer Committee of City Council in few days.

Ottawa, Ill.—Construction of sewer system in North Ottawa is contemplated; estimated cost, \$25,000.

Virden, Ill.—Plans are being considered for installation of sewerage system.

Des Moines, Ia.—Lowest bid submitted for erection of 14-mile Seventh Ward sewer system was that of J. W. Turner Improvement Co., and contract will probably be awarded to that firm. Bids are as follows: J. M. Turner Improvement Co., Des Moines, \$1,893; O. P. Herrick, Des Moines, \$1.94; E. R. Harding Co., Racine, Wis., \$1.95; Cook Construction Co., Des Moines, \$1.98; George M. King Construction Co., \$1.98½; H. J. Cathoe, Omaha, \$2.25.

Alexandria, Ind.—Council has passed resolution ordering extension of water mains to Alexandria hospital property.

Louisville, Ky.—Composite Legislation Committee, representing commercial organizations, has adopted resolution in favor of passage of enabling act by General Assembly, "providing for \$2,000,000 bond issue to build system of lateral sewers in Louisville."

Chisholm, Minn.—Engineer Lang has submitted plans for sewer disposal tank to be constructed by city; estimated cost, \$25,000.

Duluth, Minn.—Park Point residents have submitted petition for proposed large sanitary sewer in Lake ave., from

canal to 12th st., in 12th st. to Minnesota ave., and in Minnesota ave. to 43d st., with septic tank.

Duluth, Minn.—Petition has been received for installation of sanitary sewer in 3d st., from 26th ave. east to 29th ave. east to connect with sewer in 2d st.

Eveleth, Minn.—City Clerk will shortly call for bids for laying of about 1,350 ft. of sewer on Harrison st.

Stillwater, Minn.—Bids will shortly be required for construction of sewer on South Hill; estimated cost, \$32,798.

Hackensack, N. J.—Engineer Frank Campbell has announced that he will have his plans completed within next two weeks for future sewage disposal. By order of State Board of Health, Hackensack, as well as other towns now using Hackensack River for this purpose, must by end of next year find means to transfer refuse elsewhere.

Perth Amboy, N. J.—Resolution has been adopted for construction of 15-in. pipe sewer in West Side ave., from Neville st. to Jeffries st., and from Hall ave. to Jeffries st. and west along Jeffries st. by 18-in. pipe sewer to connect with sewer in Penn st.

Salem, N. J.—Salem Council has purchased about 400 ft. of wharf property on Salem River for sewage disposal plant, and eventually municipal electric light station.

Tenafly, N. J.—Installation of suitable sewer system is being discussed.

Westfield, N. J.—Report of Sewer Committee for improvements to be made at sewer farm has been accepted, and Engineer Vars has been instructed to prepare plans for approval of State Board of Health; estimated cost, \$15,000.

Dunkirk, N. Y.—As result of conference between Board of Health and H. N. Ogden, of State Department of Health, City Engineer John M. Hackett has been directed to make surveys for several routes suggested for proposed intercepting sewer and to also prepare estimates of cost.

Schenectady, N. Y.—City will construct sewer system in lower Van Vranken ave.

La Grange, N. C.—Election will be held on March 4 for voting on \$30,000 bond issue for sewer system, waterworks, electric light plant and other improvements.

Cincinnati, O.—Resolution is being considered declaring necessity to sewer Southside ave., between Idaho and Carpenter, with 12- and 15-in. vitrified pipe.

Dayton, O.—Council has voted to issue bonds in sum of \$15,000 for construction of sewers in Sewer District No. 6.

Dayton, O.—Bids will be received until 12 noon, March 5, at office of City Auditor, for purchase of \$10,500 worth of bonds for constructing sanitary sewers in Sewer District No. 9, and \$5,100 for sewer in Lakeview ave., Sewer District No. 6. G. W. Bish, Auditor.

Salem, O.—Lowest bidder on building of sewage disposal works was W. H. Ralston, of Mt. Vernon, as follows: Excavation and embankments, \$5,900; on concrete work, brick paving, gate chambers and pump house complete, \$5,123; for sand and gravel and drains needed for beds, \$37,374.64; for iron work estimate is \$1,000, and for laying of railroad siding, which city will attend to, \$1,500, making total cost, including all items, \$50,897.64, which is below estimate made by Engineer L. E. Chapin. Other bids as follows: J. C. Devine Co., of Alliance, for three main items, leaving out iron work and railroad siding, is \$10,300 for grading, \$5,949.95 for concrete, etc., and \$38,806.68 for material for filter beds, making total of \$55,056.63. Bid of Martin P. Connelly & Sons, of Youngstown, on same items was respectively \$13,000, \$6,215.50 and \$40,489.80, making total of \$59,705.30. Bid of C. M. Neeld Construction Co., of Pittsburgh, for same items was \$12,400, \$10,936.13 and \$41,870.08, making total of \$65,206.25.

Muskogee, Okla.—Ordinance has been passed creating sewer district No. 76, and for construction of sewer therein.

Portland, Ore.—City Engineer Hurlbut's specifications for construction of Sullivan's Gulch main trunk sewer, providing for stone block invert, have been changed by Council so that bids may be received also for vitrified brick for bottom of drain.

Fort Worth, Tex.—Commissioner Madox has submitted matter of building storm sewer on Texas and Jackson sts., with proposition of C. A. Wheeler to build wall on Texas st., as may be required, provided city builds sewer. Estimated cost is \$4,700. City Engineer has been instructed to advertise for bids.

San Benito, Tex.—Election will be held for voting on \$30,000 worth of bonds for sewerage.

San Marcos, Tex.—City Council is considering question of sewerage disposal.

Lynchburg, Va.—Special appropriation of \$75,000 from proceeds of bond issue will be used for sewer improvements.

CONTRACT AWARDED

Bay Minette, Ala.—By City, to Bay Minette Concrete Co., Bay Minette, for 1,200 ft. sewer pipe.

Minneapolis, Minn.—By City, for sewer pipe for year 1912, to Streator Clay Mfg. Co., Streator, Ill.

Kansas City, Mo.—For constructing complete sewage-pumping plant in Santa Fe st., near Missouri River, by Board of Public Works, to John W. Danforth, Buffalo, N. Y., at \$43,000. Unit prices for extra work were: Concrete, \$9 per cu. yd.; reinforcing steel, 3 cents per lb.; structural steel, 5 cents per lb.; piles, 75 cents each. Other bids were: Midland Bridge Co., Kansas City, \$69,600; Freeborn Engineering & Construction Co., Kansas City, \$47,827; J. H. Stone, Kansas City, \$46,000; Flanagan Bros., Kansas City, \$43,970.

Wapakoneta, O.—By County Commissioners for Pusheta ditch improvement in this county, for \$14,953, to J. B. Slaughterbeck, of Findlay, only about \$1,000 worth of improvement going to local bidders for tile work and tile.

Scranton, Pa.—By Director of Public Works C. V. Terwilliger, for construction of five sewers, one of which is sanitary sewer and other four relief systems. Jobs are given to following contractors: Prescott ave. and Mulberry st. relief sewer, Jones & Markwick, whose bid is \$8,40 a lin. ft. Estimated cost is \$22,000. Section K. 17th district sanitary sewer, Matthias Stipp & Co., at a bid o' \$3.28 per lin. ft. Estimated cost is \$51,000. Relief sewer, 17th district, South Scranton, Kearney & Co., \$8,700; Electric st., at \$2.75 a lin. ft., Kearney & Co. Relief sewer, 6th sewer district, North Main ave., Kearney & Co., at \$3 a lin. ft.

Galveston, Tex.—By City, to A. C. Falligant, of Galveston, at \$4,285.74, to construct sewer laterals in alleys between Avenues A and E, from 20th to 25th sts.

BIDS RECEIVED

Baltimore, Md.—For sanitary sewers in Frederick rd., east side Bentalon st., to western city limits, known as Contract No. 79, as follows: Martin J. Beach, 809 American Bldg., Baltimore, \$35,527.10; James Ferry & Sons, Cra'ton Station, Pittsburgh, Pa., \$37,639.35; David M. Andrew Co., Baltimore, \$38,351.15; B. F. Sweeten & Co., Baltimore, \$38,677.50; Gallagher-Bayle & Muller, Baltimore, \$40,054.35; Whiting-Turner Construction Co., Baltimore, \$40,564.65; Ryan & Reiley, 2,300 W. Lexington st., Baltimore, \$46,885.45. For Sanitary Contract No. 81, high level interceptor, Section No. 5, as follows: Ryan & Reiley, 2,300 W. Lexington st., Baltimore, \$175,867.75; Whiting-Turner Construction Co., Baltimore, \$183,161.10; J. Connolly Construction Co., 427 Scofield Bldg., Cleveland, \$183,578.50; B. F. Sweeten & Son, Baltimore, \$185,792.25; C. B. Clark & Co., 1808 Greenmount ave., Baltimore, \$193,389.25. For Canitary Contract No. 84, lateral sewers in Light and Gay sts., as follows: Ryan & Reiley, 2,300 W. Lexington st., Baltimore, \$12,832.25; Whiting-Turner Construction Co., Sexton Bldg., Baltimore, \$15,056.95; B. F. Sweeten & Son, Baltimore, \$17,459.70; N. A. Middleton, & Co., Baltimore, \$18,138.99; M. J. Beach, 809 American Bldg., Baltimore, \$20,756.70. For Sanitary Contract No. 85, house-connections across footways, as follows: Gallagher, Boyle & Muller, Baltimore, \$24,711.50; B. F. Sweeten & Son, Baltimore, \$27,727; Ryan & Reiley Co., 2,300 W. Lexington st., Baltimore, \$27,767.50; George C. Souder, Lancaster, Pa., \$36,599.50; Middleton Co., Baltimore, \$39,092.50. Calvin Hendrick, Chief Engineer.

WATER SUPPLY

Orange, Cal.—Waterworks Department will construct reinforced concrete reservoir 12½ ft. deep and 90 ft. in diameter, with capacity of 600,000 gals.

Riverside, Cal.—It has been learned that directors of Riverside Water Co. have adopted resolution declaring that they are ready to reopen negotiations with city for sale of domestic system.

Sacramento, Cal.—Plan to furnish city with mountain water, to be conveyed by means of gigantic conduit from summit of Sierras, will be submitted to Board of Trustees by James D. Stewart, manager of United Water & Power Co., of Gold Run, Placer County.

Atlanta, Ga.—In order to secure, as

early as possible, specifications and estimates of cost for new pump at river station of waterworks. Water Board has appointed special committee to take charge of all preliminary details.

Carrieton, Ill.—In order to install modern filter and extend water service in accordance with demands of city, proposition will be submitted to voters at coming city election authorizing issue of \$50,000 of bonds, in order that needed improvements may be made.

Paper City, Ill.—Question of waterworks is being discussed.

Portland, Ill.—Portland's proposed improvement of its waterworks system will cost between \$45,000 and \$55,000, according to statement made by A. T. Maltby, Consulting Engineer.

Mishawaka, Ind.—Council has authorized \$10,000 bond issue for proposed east end pumping station and extension of mains.

Richmond, Ind.—Sum of \$2,200 has been appropriated by Council for purchase of water softeners for light plant.

Baltimore, Md.—Installation of water meters have been recommended.

New Bedford, Mass.—Town has voted to authorize Water Commissioners to purchase and install additional pump at pumping station; estimated cost, \$65,000; also water system will probably be extended to and through public ways of N. Falmouth; estimated cost, \$60,000.

Cumberland, Md.—Bids will be received until 8 p.m., March 11, by Roderic Clary, Commissioner of Finance, for purchase of \$369,900 of city water improvement bonds.

Grand Rapids, Mich.—Negotiations will be entered into by city for acquisition of water power rights on both sides of river.

Duluth, Minn.—Board of Water & Light Commissioners are considering establishment of water system in New Duluth.

Ainsworth, Neb.—Vote will be taken on \$21,000 waterworks bonds for system of waterworks. W. E. M. Ely is Village Clerk.

Gretna, Neb.—Petition will be presented asking for construction of waterworks system.

Vineland, N. J.—Mayor Sawyer recommends construction of larger water main on East ave.

Vineland, N. J.—Supt. Kruse has been authorized to advertise for bids for covering water pipes with asbestos.

Vineland, N. J.—Resolution has been adopted for laying of additional 6-in. water main from intersection of East and Landis aves. to State Home for Feeble-Minded Women; estimated cost, \$4,000.

Ballston Spa, N. Y.—Board of Trustees has adopted resolution that question of acquiring Crook Brook as additional water supply be submitted to vote of taxpayers at election in March.

Chatham, N. Y.—Municipal ownership of water and electric light plants is being favorably considered.

Watervliet, N. Y.—City has decided to have its own water system. Plans will probably be shortly advertised for municipal plant.

La Grange, N. C.—Election will be held on March 4 for voting on \$30,000 bond issue for waterworks, sewer system, electric light plant and other improvements.

Oklahoma City, Okla.—Bond issue of additional \$100,000 for waterworks has been carried.

Woodville, Ore.—Installation of municipal waterworks is being planned.

Phoenixville, Pa.—Plans are being prepared by Chester & Fleming, Pittsburgh, for a 3,000,000-gal. filter plant.

Delmont, S. Dak.—Vote will be taken on bond issue for construction of municipal waterworks system.

Harlingen, Tex.—City Council has procured signed contract for Harlingen Land & Water Co. to furnish city with water for new water and light plant that is ready to be built.

Nocona, Tex.—Waterworks bonds in sum of \$17,500 have been sold.

Richmond, Va.—Subcommittee of Council Committee on Water are considering plans for laying 20-in. water main, from present mains at city electric plant across James River, to supply South Richmond. Negotiations are now pending for right of way across Belle Isle.

La Crosse, Wis.—Bonds in sum of \$350,000 have been issued for installation of new water plant.

Milwaukee, Wis.—City Controller Dietz has asked Legal Department to prepare \$300,000 bond ordinance for Water Department.

CONTRACTS AWARDED

Nogales, Ariz.—For installing pumping plant at Santa Cruz River and laying main to connect plant with present system, to Karns Bros., Nogales, at \$50,000.

San Francisco, Cal.—To F. C. Storrie & Co., 15th ave. and 2d st., San Francisco, at \$181,519, for hauling and laying pipe for auxiliary water supply system in district bounded by bay, Market and Powell sts.

San Francisco, Cal.—By Board of Public Works, for mechanical equipment of pumping station No. 2, to Charles C. Moore & Co., for \$140,000, this being firm's bid on second proposition submitted. Pumping station will be located at Fort Mason.

Macon, Ga.—By Board of Waterworks Commissioners, for laying mains in South Macon, East Macon, North Macon and Vineville and for construction of a reservoir near Fort Hill cemetery, in East Macon, as follows: J. B. McCrary Contracting Co.'s bid of \$29,500 for extension of mains. Work must be completed within 200 days after beginning. Southern Engineering & Contracting Co., a Macon firm, composed of C. M. Preston, W. C. Redding and Maitland Solomon, who bid \$8,704, was given contract for reservoir.

Unadilla, Ga.—By City, to Schofield's Sons Co., Macon, Ga., to construct 100,000-gal. water tank on 100-ft. tower, and to W. H. Hogsett to drill well.

Washington, Ga.—By City, to Tucker & Laxton, Charlotte, N. C., for waterworks construction.

Atlanta, Ga.—By City Bond Commission for 2,100 tons of cast iron piping to be used on water mains to be constructed with the money. The General Pipe & Foundry Co. was awarded contract for 400 tons of piping at rate of \$20.25 per ton. It only bid for 400 tons of the work. Remainder of the contract, 1,700 tons, went to United States Cast Iron & Foundry Co. at rate of \$20.35 per ton.

Macon, Ga.—By City, for laying water mains, to J. B. McCrary Co., of Atlanta, at \$29,000, city furnishing pipe, hydrants, etc.

Blue Mound, Ill.—For improving and extending waterworks system, to National Co., South Bend, Ind., at about \$11,000.

Chicago, Ill.—By Department of Public Works, for water department supplies as follows: For 24,860 tons of 12-, 24-, 30- and 36-in. cast iron water pipe, United States Cast Iron Pipe & Foundry Co., \$24.15 per ton, and J. B. Clow & Sons, \$25.25 per ton.

Dubuque, Iowa.—For furnishing and erecting 2,000,000-gal. duplex, double-acting, motor-driven pump at Level Pumping Station, to Prescott Steam Pump Co., at \$8,203.

Quincy, Mass.—For furnishing 2,600 disk meters, ½- and 1-in., to Hersey Mfg. Co., Second st., South Boston.

St. Paul, Minn.—By Water Board, for new water mains and special castings, to United States Cast Iron Pipe & Foundry Co., at Chicago, on a bid of \$122,000. Contract stipulates that large pipes shall be 24-, 30- and 36-in., and shipments must begin Feb. 15 and continue at rate of at least 150 ft. a day. Secretary of Board was authorized to advertise for bids for laying and drayage of the pipes.

Brooklyn, N. Y.—By City, for installation of water system, for Manhasset and Lakeville districts of Long Island, to W. G. Fritz, of Stover, N. J., at \$115,619. Next bidder was that of Harrison Construction Co., of Harrison, N. J., of \$115,051. Contract calls for the erection of standpipe waterworks, 21 miles of pipe line and 170 hydrants.

Manhasset, L. I., N. Y.—For installing waterworks systems for Manhasset and Lakeville, to W. G. Fritz, Stover, N. J., at \$115,619.

Solvay, N. Y.—By village of Solvay, with Syracuse Suburban Water Co., for supply of Otisco Lake water for 5 years.

Toledo, O.—To DeVore-McGormley Co. of Toledo, to do designing engineering work on high pressure pumping station and will receive 5 per cent. of total cost of plant and equipment. Council has appropriated \$12,000 for the task.

El Reno, Okla.—By City, to Pennsylvania Drilling Co., at \$13,575, to drill well 10 ft. deep; total estimated cost, \$22,000.

Tallihina, Okla.—For constructing waterworks system, to Terry Contracting Co., Poteau, at \$21,670.

Columbia, S. C.—By City, to American Machinery & Manufacturing Co., Charlotte, N. C., at \$5,891.67 to repair power pumping station at waterworks; work will consist of resetting pumps on new foundations, new shafting, reboring water wheels, pedestals for boxes, etc.

Lexington, Tenn.—By City, to Southern Well & Contracting Co., Drakesboro, Ky., to drill deep well.

Stephenville, Tex.—By City, to Barham & Kiker, to drill two deep wells; \$18,000 bond issue authorized.

Richmond, Va.—By Water Department, as follows: To Glamorgan Pipe & Foundry Co., Lynchburg, Va., cast iron specials, \$50 per ton; cast iron pipe, 20-in., \$20.90 per ton; 16-in., \$20.90 per ton; 12-in., \$21.40 per ton; 8-in., \$21.40 per ton; 6-in., \$21.90 per ton; 4-in., \$23.40 per ton; 3-nozzle fire hydrants, \$22.70 per ton; to J. L. Lindsay, Richmond, gate valves, 4-in., \$5.52 each; 6-in., \$8.40; 8-in., \$13.20; 10-in., \$21.70; 12-in., \$27.10; 16-in., \$56; 20-in., \$95.

Seattle, Wash.—By City, for water mains on 15th ave. south, to Erickson Bros., at \$8,272.40; also for water main tunnel on 12 ave. south, to G. C. Dietrick, at \$26,636.20.

LIGHTING AND POWER

Glendale, Cal.—Lights in West Glendale, for which \$40,000 bonds were voted Feb. 2, will be installed as soon as bonds can be issued and sold.

Nevada City, Cal.—Grass Valley has agreed to conference with Nevada City relative to establishment of joint electric lighting system, including power plant.

Tropic, Cal.—In regular session City Trustees ordered election to be held March 12, for purpose of voting on issuance of \$20,000 bonds to install electric lighting plant.

Vallejo, Cal.—Bids for furnishing city with lighting have been opened by Commissioners. Vallejo Electric Light & Power Co. was only bidder. It offered to furnish light from April 1 to Nov. 1 at \$6.25 a month for each arc light, lights to burn until 2 a.m. For all-night service \$7 was bid. Old rate was \$6.75 for the 2 o'clock service, and \$7.25 for all-night service. Council accepted bid for all-night service.

Boulder, Col.—Erection of municipal light plant to cost about \$90,000 or \$95,000 is being discussed. Prof. H. S. Evans has submitted report on same to City Council.

Tompsonville, Conn.—Residents of Wallop district of town have circulated petition which has been presented to Selectmen, requesting that town install electric lights in Wallop rd. through Powder Hollow and Wallop district to corner, near residence of Olin S. Olmstead.

Americus, Ga.—March 20 has been named as day for election to be held to decide whether city will issue bonds to amount of \$60,000 for establishment of municipal electric light plant and installation of water meters throughout city.

Atlanta, Ga.—Bids, addressed to J. E. McClelland, chairman of Electric Light Committee, will be received at office of chief of construction until 10 a.m., Monday, March 11, as to cost of making examination and report on electric situation in Atlanta with view to construction of municipal plant. J. E. McClelland, Chairman Electric Light Committee.

Atlanta, Ga.—City Council has voted in favor of construction and operation of municipal light, power and heat plant. Bond issue for same will be prepared.

Cartersville, Ga.—Commissioners of this city are planning to submit at early date bond issue for purpose of enlarging and extending waterworks system and electric light plant, putting in day current and electricity, and erection of handsome City Hall. Issue will probably approximate \$60,000.

Michigan City, Ind.—Petition is now in circulation for presentation to Council, asking that body to draft ordinance providing for boulevard system of lighting both sides of Franklin st., from bridge to Baltimore st.

Michigan City, Ind.—Installation of ornamental lighting system in Franklin st. is being considered.

Anamosa, Ia.—Vote will be taken March 11 on granting to F. J. Cross, electric light and power franchise for 25 years.

Fontanelle, Ia.—Cost of electric light plant is being discussed.

Laurens, Ia.—Construction of electric light plant will be voted on March 25.

Duluth, Minn.—City Council has passed resolution directing installation of arc lamps at Fond du Lac, New Duluth, Gary, Smithville and Spirit Lake.

Morris, Minn.—Petition is being circulated for special election for voting on bonds for construction of electric light and power plant.

St. Joseph, Mo.—Robert E. McDonald and G. E. Hines, of Kansas City, have reported to Council that reconstruction of municipal lighting plant so as to make possible commercial lighting and furnishing of power would cost \$300,000. To build entire new plant would cost \$500,000.

Camden, N. J.—Lighting Committee of Council has decided to erect municipal electric plant.

Kearny, N. J.—Kearny Town Council joined with Harrison in demand on Public Service for \$70 rate per arc light, instead of \$85 a year, which both towns are now paying. Resolution that five-year contract be tendered company providing for \$70 rate was introduced by Councilman Robert E. Torrance.

Camden, N. J.—Plans for city-owned lighting plant have been ordered drawn by Council.

Perth Amboy, N. J.—Petition has been presented asking for better lighting system in northwestern section of city.

Vineland, N. J.—Resolution has been adopted for new street light service, to cost \$5,000.

Vineland, N. J.—Resolution has been adopted for purchase of new pump for power house; cost, \$1,750; smokestack, to cost \$2,250; steam piping at power plant, \$2,000, and new engine and generator, \$10,000.

Chatham, N. Y.—Municipal ownership of electric light and water plants is being favorably considered.

Cohoes, N. Y.—Adirondack Power Co. has made application to Chamber of Commerce for franchise to supply electric power in this city. Company, if allowed to come into Cohoes, will locate its plant in east side.

Mt. Vernon, N. Y.—Mayor Fiske recommends installation of adequate street lighting system for business section.

Niagara Falls, N. Y.—Appropriation is being considered for permanent illumination of the Falls.

Olean, N. Y.—Olean Electric Light & Power Co. has submitted offer to furnish 150 arc street lights at \$60 per year, and 40 ornamental poles, with four lamps each, at rate of \$55 per pole for all-night use and \$27.50 for use but half night. This offer will probably be accepted for period of 10 years.

Newburgh, N. Y.—Petition has been presented asking for better lighting of Broadway, between Colden and Mill sts.

Sayville, L. I., N. Y.—By decision of Islip Town Board South Shore Gas Co., now supplying gas to Bay Shore, Islip and East Islip is to continue its pipes into east end of the township.

La Grange, N. C.—Election will be held on March 4, for voting on \$30,000 bond issue for electric light plant, waterworks, sewer system and other improvements.

Siler, N. C.—City Commissioners have granted franchise to J. Wade Siler and W. D. Siler to install electric light system.

Lehighton, Pa.—Special meeting of Lehighton Council has been held to act on matter of granting gas franchise to Public Service Co. of Philadelphia, and committees have been appointed.

Port Arthur, Tex.—City Commission has passed ordinance giving franchise for 21 years to J. S. Connally and associates to supply city of Port Arthur with gas for household use.

Salt Lake, Utah—Extension of municipal ownership to include city electric light plant, gas plant and asphalt repair plant, has been considered by City Commission. All of this service is obtained now by contract.

Berlin, Wis.—Establishment of electric lighting plant in connection with municipal waterworks system is being considered.

CONTRACTS AWARDED

Pasadena, Cal.—For furnishing and installing 171 statuary bronze electrolors on South Orange Grove ave., to W. S. McNally, at \$30,400.

Washington, Ga.—By City, to Tucker & Laxton, Charlotte, N. C., to rebuild electric light and waterworks plant.

La Salle, Ill.—For installation of street lighting system, to General Electric Co., Schenectady, N. Y., at \$6,199.

Groton, N. Y.—For 150-kw., direct-connected, 250-volt steam unit and generator set for three-wire system, to Westinghouse Electrical & Manufacturing Co., Pittsburgh, Pa., at \$5,500.

Lexington, Tenn.—By City, to Zeb Ward, Little Rock, Ark., to erect electric light plant.

Fort Worth, Tex.—By City, for installing heating plant in City Hall, to McDonald & Blevins, at \$1,191.

FIRE EQUIPMENT

Fort Smith, Ark.—Bids have been advertised for auto truck, hook and ladder wagon.

Lodi, Cal.—Lodi Volunteer Fire Department has taken upon itself task of raising \$850 with which to install Game-

well fire alarm system without asking City Trustees for any assistance.

New Britain, Conn.—Purchase of two new fire autos will be recommended by Board of Public Safety to Board of Finance; estimated cost, \$6,000 each.

Gainesville, Fla.—Purchase of auto for use of Chief N. E. Benson has been authorized.

Clinton, Ia.—City Council has ordered City Clerk to advertise for bids for purchase of 1,500 ft. of fire hose.

Noway, Ia.—City Council is planning purchase of new chemical engine.

Sioux City, Ia.—Department of Public Safety has been authorized to advertise for bids on auto fire engine; cost, \$10,000.

Hammond, Ia.—Town will purchase supply of new fire apparatus.

Richmond, Ind.—Appropriation of \$6,000 has been made for purchase of new auto fire truck. Bids will be secured at once.

Lynn, Mass.—Proposals have been asked for one combination auto, one chemical auto, with at least two 50-gal. tanks; one chassis, capable of carrying two chemical tanks and body, and one auto patrol wagon for Police Department.

Haverhill, Mass.—New fire and police alarm system, to cost \$21,000, is being discussed.

New Bedford, Mass.—Committee on Fire Department has recommended that contract for 1,000 ft. of fire hose be given to C. C. C. Fire Hose & Rubber Co., at 78 $\frac{1}{4}$ cents per ft.; also that automobile chassis be purchased from S. C. Lowe Supply Co., at \$4,664, and for furnishing 10 fire alarm boxes to Gamewell Co., at \$1,250.

Hyattsville, Md.—Election will probably be held March 4 for voting on \$7,000 loan with which to erect and equip building for Fire Department and municipal purposes.

Springfield, Mass.—Purchase of new motor-driven truck in local department is being discussed.

Bay City, Mich.—Plans have been adopted for proposed new hose house to be erected on McKinley ave. and Adams st.; cost, \$21,000 to \$22,000. Architects, Clark & Munger.

Duluth, Minn.—Bids are being received by John Connally, Secretary to Board of Fire Commissioners, for new automobile for fire department chief.

Anaconda, Mont.—Purchase of motor apparatus is being considered.

Lincoln, Neb.—Purchase of combination auto chemical and hose wagon is under consideration.

Newark, N. J.—Petition has been presented urging appropriation to acquire site and to erect first truck house in Vailsburgh section.

Perth Amboy, N. J.—L. C. Dalton, Chairman of Fire Committee, recommends purchase of 4,000 ft. of new hose for fire companies.

Trenton, N. J.—Appropriation of \$2,800 is being considered for purchase of runabout for Fire Chief; also \$1,000 for purpose of starting work of reconstructing all fire alarm systems.

Brooklyn, N. Y.—Plans for four new fire engine houses in Brooklyn and Queens have been disapproved by Municipal Art Commission, and architect, Jay H. Morgan, of Brooklyn, has been asked to make new drawings and submit them to Commission for consideration at March meeting.

Rochester, N. Y.—Purchase of three autos, one second size fire engine, 5,000 ft. hose and erection of three additional fire houses is recommended by Chief Charles Little.

Yonkers, N. Y.—Installation of new fire alarm system is being considered.

Rocky Mount, N. C.—Appropriation is being contemplated for purchase of chemical engine.

Nyack, N. Y.—Proposition asking for appropriation for fire alarm system will be submitted to taxpayers at coming election.

Youngstown, O.—City Council has approved of bond issue ordinance for \$70,000 for motorizing fire fighting equipment.

Eugene, Ore.—Council will order automobile fire engine. It will have rotary pump to be used in pumping water from hydrants when pressure in mains is low, also to pump from stream or well in case fire is out of reach of city water system. It will cost about \$7,920.

Mt. Penn, Pa.—Purchase of hand chemical engine has been authorized for fire company.

Reading, Pa.—At special meeting of Councils' Committee on Fire, it decided to make recommendations to Finance Committee that will entail expenditure of \$28,000 for new apparatus for four of fire companies of city. Specific items that

will be recommended are as follows: New automobile engine for Hampden Co., \$8,500; new automobile engine for Liberty Co., \$8,500; automobile combination chemical wagon for Junior Co., \$5,500; automobile combination chemical wagon for Reading Hose, \$5,500; placing underground of fire alarm wires, \$1,500.

Williamsport, Pa.—Appropriation of \$8,500 has been made for purchase of automobile fire truck.

Doland, S. Dak.—Purchase of new chemical engine and other apparatus is being considered.

Dallas, Tex.—Bond issue of from \$110,000 to \$125,000 for permanent improvements in Fire Department is estimated. Commissioner Bartlett makes of amount he will ask Board to submit for department at spring election.

Milwaukee, Wis.—City Controller Dietz has asked Legal Department to prepare \$40,000 bond ordinance for Fire Department.

Racine, Wis.—Three automobile fire steamers, to furnish pressure in event of large fire, are urged by Mayor W. S. Goodland.

CONTRACT AWARDED

Camden, N. J.—By City Council, for two auto combination chemical trucks, to Robinson Combination Hose & Chemical Co., at \$9,000.

BRIDGES

Jacksonville, Fla.—Plans have been completed by Gail L. Barnard, for construction of new bridge 526 ft. long at Trout Creek on Lem Turner rd.

Ottawa, Ill.—Construction of new bridge on Main st., to cost \$4,000, is being considered.

Saginaw, Mich.—City will apply to Board of Supervisors for permission to construct bridge for general highway purposes across Saginaw River, on extension of Johnson st.

Vermillion, Minn.—Bids are being received for construction of steel bridge across Vermillion River.

Dayton, O.—Bids will be received until 12 noon, March 5, at office of City Auditor, for purchase of \$15,000 for construction of bridge over Stewart st. G. W. Bish, Auditor.

Jasper, Ore.—Lane County Court has just granted petition for constructing bridge across Willamette River at Jasper.

Altoona, Pa.—City Engineer has been authorized to advertise for bids for extensions of piers for Seventh st. bridge.

Pierre, S. Dak.—Construction of bridge across Cheyenne River is being asked for by Pennington County; estimated cost, \$25,000.

Nacogdoches, Tex.—City Council has contracted with Dallas firm for construction of two concrete bridges over Banita Creek, which runs through city—one on Main st. toward Union depot, and other over South Fredonia st., which is south from Court House—for the sum of \$3,795.

Brigham City, Utah—Petition has been presented asking city to build bridges over Box Elder Creek in Third East and Third North.

Appleton, Wis.—Additional appropriation of \$1,320 will be asked for construction of Scherzer rolling lift or bascule bridge over Fox River, between Vandebrock and Kimberly; total cost is \$27,640.

CONTRACTS AWARDED

Osceola, Ark.—By Drainage District No. 9, to Stiles Steel Bridge & Construction Co., of St. Louis, Mo., at \$14,411, to construct 22 steel bridges.

Guadalupe, Cal.—By Board of Supervisors, to Midland Bridge Co., Gibraltar Bldg., Kansas City, Mo., contract for construction of steel and concrete bridge across Santa Maria River, at Guadalupe, at \$46,000.

Powder Springs, Ga.—For constructing 60-ft. concrete bridge over Powder Creek, by County Commissioners, to Virginia Bridge & Iron Co., Atlanta, Ga.

Greenup, Ill.—For constructing 217-ft. reinforced concrete viaduct between Union and Cottonwood Townships, to P. J. Coggin, at \$8,120.

Hallock, Ill.—By Boards of Commissioners of Highways and Committee of Roads and Bridges of County Board, for construction of bridge, to the Joliet Bridge & Iron Co., Joliet, Ill., at \$1,921. Other bids as follows: Stiles Steel Bridge & Concrete Co., St. Louis, Mo., \$2,025; Burnham & Ives Co., Bloomington, Ill., \$2,320; Martin Malone, Peoria, Ill., \$2,553; Schmitt Construction Co., Peoria, Ill., \$1,970; Clinton Bridge & Iron Works, Clinton, Ia., \$2,295. Town of Timber (new construction and repairs) Shock bridge, to Porter McCully Construction Co., Mackinaw, Ill., at \$1,231. Other bids as fol-

lows: Stites Steel Bridge & Concrete Co., St. Louis, Mo., \$1,517; the Joliet Bridge & Iron Co., Joliet, Ill., \$1,422; Burnham & Ives Co., Bloomington, Ill., \$1,662; Clinton Bridge & Iron Works, Clinton, Ia., \$1,975; Schmitt Construction Co., Peoria, Ill., \$1,580. Town of Timber (new construction and repairs) Vandeventer bridge, to Martin Malone, Peoria, Ill., at \$1,619. Other bids as follows: Burnham & Ives Co., Bloomington, Ill., \$1,900; Clinton Bridge & Iron Works, Clinton, Ia., \$1,919; Porter McCully Construction Co., Mackinaw, Ill., \$1,780; Miller Bros., Peoria, Ill., \$2,584; Stites Steel Bridge & Concrete Co., St. Louis, Mo., \$1,290. Agent made error in proposal and refused to sign contract and said proposal was rejected. The Joliet Bridge & Iron Co., Joliet, Ill., \$1,774; the Schmitt Construction Co., Peoria, Ill., \$1,894. Town of Timber (new concrete and steel construction) Payton Creek bridge, to Edward Cooney, Tremont, Ill., at \$944. Other bids as follows: Weigert Constr. Co., Bushnell, Ill., \$1,100; Schmitt Constr. Co., Peoria, Ill., \$1,166; Burnham & Ives Co., Bloomington, Ill., \$1,285; Stites Steel Bridge & Concrete Co., St. Louis, Mo., \$1,210; Porter McCully Construction Co., Mackinaw, Ill., \$1,298; Clinton Bridge & Iron Works, Clinton, Ia., \$1,317; the Joliet Bridge & Iron Co., Joliet, Ill., \$1,165.

Cayuga, Ind.—For constructing Army Ford Bridge across Big Vermilion River, east of Cayuga, and Brulett's Creek bridge in Clinton Township, to Central States Bridge Co., Indianapolis, at \$13,170 and \$8,870, respectively.

Decatur, Ind.—For constructing bridge over St. Mary's River, at Decatur, to Burk Construction Co., Newcastle, Ind., at \$17,490.

Reading, Pa.—For constructing reinforced concrete viaduct at Penn st., to L. H. Focht, Baer Bldg., Reading, at \$325,910. Structure will be 1,350 ft. long and 80 ft. wide, and will be composed of nine 48-ft. arches, five 100-ft. arches, and a retaining wall.

Dallas, Tex.—Board of Municipal Commissioners has ordered building of reinforced concrete bridge across Mill Creek, at Pecos st., retaining walls on Bryan st. at Adair, and wooden bridge at end of Adair st. Estimated cost of total, \$3,045. Work will be done by city forces, under direction of City Engineer J. M. Preston.

Houston, Va.—By Supervisors of Halifax County, to Roanoke Bridge Co., Roanoke, Va., for construction of bridge across Banister River.

Lynchburg, Va.—To Virginia Bridge & Iron Co., Roanoke, Va., at \$4,100, to construct steel bridge from Fredonia ave. to island recreation grounds of Young Men's Christian Association.

Seattle, Wash.—By City, for construction of Fremont ave. viaduct, to T. Ryan, at \$46,323.92.

Ameria, Wis.—To Hughitt Bridge Co., Amery, at \$5,300, for erecting steel span bridge, 140 ft. long, over Apple River.

MISCELLANEOUS

Montgomery, Ala.—Bids will shortly be asked by City Commission for motorcycles for Police Department.

Pasadena, Cal.—Citizens have voted \$60,000 of bonds for construction of garbage incinerator.

Hartford, Conn.—Plans for development of Colt Park are being discussed.

Hartford, Conn.—Resolution has been adopted to submit to electors proposition to vote on additional sum of \$800,000 for municipal building.

Hartford, Conn.—Police Commissioners have asked for appropriation of \$25,000 for purchase and installation of police signal system.

Atlanta, Ga.—Special crematory committee of Board of Health will hold meeting to finally agree on plans and specifications for garbage disposal plant which they will recommend to be built. Specifications are now being drawn by W. A. Hansell, Assistant Engineer to Chief of Construction, and will be ready to submit to committee.

Atlanta, Ga.—Architects of Atlanta have been asked by Park Department to submit competitive plans for new cyclorama building in Grant Park for which City Council has appropriated \$15,000.

Cairo, Ill.—City Hall ordinance and public library new addition ordinance have been passed by City Council.

South Bend, Ind.—Park extensions, to cost about \$100,000, is under consideration. It will mean extension of Studenbaker, Leeper and Howard Parks.

Louisville, Ky.—Board of Public Works has authorized purchase of eight dump wagons.

Hyattsville, Md.—Election will probably be held March 4 for voting on \$7,000 loan which will be used to erect and equip building for municipal and fire department purposes.

Bay City, Mich.—County Clerk Marsae will advertise for bids for dump carts to be employed in hauling stone to road.

Trenton, N. J.—Appropriation of \$3,500 has been provided for purchase of combination auto ambulance.

Trenton, N. J.—Purchase of two automobiles for Bureau of Health is under consideration.

Cortland, N. Y.—Board of Health has asked for sealed proposals for municipal collection of garbage for year ending April, 1913. Bids are to be opened March 1. City is to furnish wagons and bidders to dispose of garbage.

Youngstown, O.—Additional wing to City Hospital is contemplated.

Oklahoma City, Okla.—Bond issue of \$150,000 to buy parks has been carried.

Erie, Pa.—Proposals for collection and disposal of garbage have been received and referred to joint garbage committee for investigation.

West Chester, Pa.—Estimated cost of proposed new Municipal Hall is \$14,000.

Columbia, S. C.—People will vote on \$1,000,000 bond issue for improvements at State Asylum for Insane.

Chattanooga, Tenn.—Citizens will vote on issuing of bonds in amount of \$250,000 for park purposes on March 26.

Chattanooga, Tenn.—In order to build new Hamilton County jail within receipts of original bond issue of \$75,000, committee has refused all first bids offered and will change specifications. New bids will then be advertised for.

Chattanooga, Tenn.—Bond issue of \$250,000 will probably be voted for park purpose.

Chattanooga, Tenn.—Proposals for construction of new Hamilton County Jail have been rejected, and bids will be readvertised.

Fairmont, Va.—Board of Police Commissioners has discussed flashlight system and has decided to ask Police Committee of Council, in whose hands the matter now is, to advertise for bids for installation of system.

Richmond, Va.—Plans and specifications for new First Market have been approved, and Committee on Markets has been instructed to secure bids for two buildings separately.

Norfolk, Va.—Eighteen resolutions of City Council have been approved by Mayor Riddick, batch including resolution describing scheme of public improvements in 10th Ward which will necessitate an expenditure of \$214,000.

Spokane, Wash.—Majority of City Council has agreed to submit to popular vote proposal to issue \$500,000 bonds to build municipal auditorium, if petition bearing names of 2,000 electors in favor of plan was presented.

Milwaukee, Wis.—City Controller Dietz has asked Legal Department to prepare following bond ordinances: Park, \$60,000; hospital, \$10,000; docking and dredging, \$110,000, and Menomonee flushing tunnel, \$265,000.

Racine, Wis.—Ordinance has been adopted providing for collection of garbage by city, and City Clerk will advertise for sites for garbage plant. Bond issue of \$30,000 has been voted.

Racine, Wis.—Erection of new police station in rear of City Hall will be recommended by Chief of Police H. C. Baker; estimated cost, \$18,000.

CONTRACTS AWARDED

San Francisco, Cal.—By Board of Fire Commissioners, for two-ton auto delivery truck, to White Automobile Co., at \$3,500.

Cairo, Ill.—By City, for collection of garbage for one year, to William Linville, at \$1,555.

Sioux City, Ia.—By City, for two carloads of 6-in. pipe, to American Cast Iron Pipe Co., at \$24.85 per ton.

Louisville, Ky.—By Hospital Commission, for bricks to be used for facing new \$1,000,000 City Hospital, to Hydraulic Fired Brick Co., of Brazil, for about \$20,000.

St. Paul, Minn.—By City, for erection of concrete retaining wall on north side of Harriet Island, to Thornton Bros., at \$3,787.

Binghamton, N. Y.—For reconstructing Austin dam, to Owego Bridge Co.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK.	ADDRESS INQUIRIES TO
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STREET IMPROVEMENTS.

New Jersey.....	Union.....	Mar. 4, 8 p.m.....	Furn. stone for highways.....	George Compton, Clk.
Texas.....	San Antonio.....	Mar. 2, 11 a.m.....	Constrn. clay road.....	J. V. Huntress, County Aud.
Indiana.....	Shoals.....	Mar. 4, 10 a.m.....	Constrn. county roads.....	County Auditor.
Iowa.....	Davenport.....	Mar. 5.....	Constrn. 4 blocks brick and 3 blocks bituminous macadam.....	A. M. Compton, Chm. Br. Pub. Wks.
New York.....	Long Island City.	Mar. 6, 11 a.m.....	Repair, asphalt, laying asphalt blocks, sidewalks.....	M. E. Connolly, Boro. Pres.
New York.....	New York.....	Mar. 6, 2 p.m.....	Pavg. with wood and improved granite a number of streets.	Geo. McAneny, Boro. Pres.
Indiana.....	Princeton.....	Mar. 6.....	Macadamizing highways.....	W. T. Roberts, County Aud.
Indiana.....	Winchester.....	Mar. 7.....	Improving highways.....	H. F. Wood, County Aud.
North Dakota.....	Fargo.....	Mar. 11, 8 p.m.....	Pavg. 11 streets; various materials.....	E. R. Orchard, City Aud.
Wisconsin.....	La Crosse.....	Mar. 15.....	Constrn. 10,000 yds. creosote block paving.....	City Clerk.
Ohio.....	Cincinnati.....	Mar. 15.....	Improving road.....	County Commissioners.
Ohio.....	Canton.....	Mar. 20, 10 a.m.....	Constrn. 10,000 yds. brick pavement, drainage, etc.....	J. H. McConnell, County Aud.

WATER SUPPLY

Washington....	Spokane.....	Mar. 7.....	Furn. 26,500 ft. 24 and 30-in. c. i. pipes, valves, etc.....	City Commissioners.
Minnesota....	St. Paul.....	Mar. 11, noon.....	Installg. 1,500,000-gal. pump.....	John Caulfield, Sec'y Water Comm.
Pennsylvania....	McKeesport.....	Mar. 14, 4 p.m.....	Furn. c. i. water pipe and specials.....	C. E. Soles, City Compt.

BRIDGES

Indiana.....	Richmond.....	Mar. 9, 11 a.m.....	Constrn. bridges and culverts.....	L. S. Bowman, Aud.
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MISCELLANEOUS

New York.....	Newburg.....	Mar. 4, 5 p.m.....	Furn. 10-ton road roller and 2-horse street sweeper.....	Street Committee.
Minnesota....	St. Paul.....	Mar. 5, 5 p.m.....	Furn. asph. mix'g plant, 8-ton asph. roller and road scarifier.	Oscar Claussen, Comm. Pub. Wks.
New York....	Brooklyn.....	Mar. 6, 11 a.m.....	Furn. 700 tons quicklime.....	A. E. Steers, Boro. Pres.
New York....	New York.....	Mar. 6, 3 p.m.....	Furn. 2,000 tons paving pitch, 1,700 bbls. Portland cement, gravel and sand.....	Geo. McAneny, Boro. Pres.
New York....	Long Island City.	Mar. 6, 11 a.m.....	Furn. five 10-ton steam road roll'r's & eight light road gradrs.	M. E. Connolly, Boro. Pres.
New York....	New York.....	Mar. 7, 3 p.m.....	Furn. 200 bbls. Portland cement.....	C. B. Stover, Pres. Park Comm.

STREET IMPROVEMENTS

Los Angeles, Cal.—Ordinances for various street improvements have been prepared.

Atlanta, Ga.—Chamber of Commerce will recommend to Mayor and Council that street paving in various parts of city be improved.

East St. Louis, Ill.—Ordinance has been passed providing for construction of mile of sidewalk on both sides of Ninth st., from St. Clair ave. to city limits.

Muncie, Ind.—By large majority voters of Washington Township have decided in favor of building of gravel road five and three-quarter miles in length. Roadway will be in center of township and slightly to west. It is expected to cost \$21,000 and will take place of some mud roads.

Fort Scott, Kan.—Ordinance has been passed for issuance of \$13,570 worth of bonds for grading, paving and curbing of Main st.

Louisville, Ky.—Lowest bid received for reconstruction of Western blvd. was that of F. J. Breslin, at \$5,000.

St. Paul, Minn.—Bids for asphalt plant to be used in repairing and laying asphalt streets during 1912 will be advertised for immediately. Oscar Claussen, Commissioner of Public Works. G. H. Herrold, Office Engineer.

Omaha, Neb.—Bond issue of \$538,500 has been authorized; \$288,500 of this is for street improvements.

Haddonfield, N. J.—Haddonfield Council is discussing plans for more street paving.

Irvington, N. J.—Application has been made to Committee on Roads of Board of Freeholders for paving of Springfield ave. with grouted granite.

Amsterdam, N. Y.—Petition has been presented for extension of Grand st. through to Locust ave.

Lowville, N. Y.—Paving of State st. has been authorized and committee has been appointed to determine kind of paving to be used.

Moravia, N. Y.—Bonds in sum of \$10,000 have been authorized to defray cost of paving Main st. with brick.

Newburgh, N. Y.—City Council has decided on permanent improvement of Broadway, from east side of Mill st. to West st. Plans have been prepared by City Engineer Blake.

New York City, N. Y.—Borough of Manhattan is provided this year with funds to amount of at least \$3,500,000 to be used in repaving, and contracts will be advertised in near future covering large portion of this work, which will include sheet asphalt, granite and wood block pavements, all laid on concrete foundation, together with certain other varieties in smaller quantities. E. V. Frothingham, Commissioner.

Dayton, O.—Question of paving Epworth ave. is being discussed.

Dayton, O.—Street Superintendent Robert J. Paul will meet with Finance Committee of City Council and present estimate of \$35,000 as amount that would be needed during next year for asphalt street paving.

Grant's Pass, Ore.—City Council will be asked at next meeting by property owners to improve about 60,000 sq. yds. of street surface by laying oiled macadam roadway and construction of necessary curbs and gutters and cement sidewalks for entire district. F. E. Hobson, City Engineer.

Chester, Pa.—Ordinances have been adopted for curbing and paving sidewalks on Weigand ave., from Pennell st., and on Smith ave., from Pennell st.; also for paving of several streets with brick, bitulithic, asphalt, macadam, wood block, or any other improved material.

Erie, Pa.—Plans have been adopted for widening of Lower State st.

Sioux Falls, S. Dak.—Ordinances have been passed for grading and improving various city streets.

Dallas, Tex.—Bids for construction and repair of four cardinal and seven intermediate roads of county have been rejected by County Commissioners, and have been readvertised.

Norfolk, Va.—Expenditure of \$110,466 for street improvements, including water and sewer pipes, is planned by City Engineer for Ninth Ward Committee.

Richmond, Va.—Plans are being prepared in office of City Engineer for opening 15th st., from Franklin to Marshall st.

CONTRACTS AWARDED

Coronado, Cal.—For paving, etc., on 3d st., to H. G. Fenton, of San Diego, as follows: Excavation, 30c. per cu. yd.; embankment, 10c. per cu. yd.; paving, 10c. per sq. ft.; total cost, \$13,626.

Hartford, Conn.—For paving, as follows (price given per lin. ft. unless otherwise stated): (a) telford, (b) gravel, (c)

macadam, (d) macadam telford, (e) rubber drain: E. D. Pierce, Jr., Co., for 12,138 ft. road in Munroe, at 60c. for (a) and \$1 for (e); Jos. D'Alvia, of Boston, Mass., 11,345 lin. ft. in Oxford, at 83c. for (b), \$1 for (a) and 90c. for (e); Tony Leo, of Eagleville, 7,188 lin. ft. in Ashford, for \$11,895, and 4,000 ft. in old Saybrook, at \$1.76 $\frac{3}{4}$ for (c), \$2.69 for (d) and \$1 for (e); Leonardo Suzio, of Meriden, 5,076 ft. in Berlin, \$1.52 for (e), \$2.52 for (d) and \$1 for (e); Frank Arrigoni & Bro., Middlebury, 18,200 ft. in Franklin, for \$24,282, and to Pierson Engineering & Constr. Co., 1,854 ft. at \$1.25 for (c), \$1 for (e).

New Britain, Conn.—By Board of Public Works, for paving 8,450 sq. yds. on Arch st.: Southern New England Paving Co., with asphalt, at \$2.35; Warren Bros. Co., of Boston, Mass., with bitulithic, \$2.42, and Connecticut Hassam Paving Co., with brick, \$2.54 per sq. yd.

Lafayette, Ind.—By Board of County Commissioners, for constructing Tower Road in Tippecanoe Township to Wm. Mahoney, of Greencastle, for \$7,250.

Rushville, Ind.—By Board of County Commissioners, for constructing eight roads in Rush County, as follows: Thurston & Steel, two roads, \$29,430; Nicholson & Pearce, two roads, \$55,765; J. A. Hardin & Co., \$15,569; O'Connor Bros., \$9,440; J. B. Reasoner, \$15,934, and J. W. Stevens, \$8,350.

Louisville, Ky.—By city for construction of granitoid sidewalks, to H. H. Snyder Co., Edwin S. Larson, American Concrete Constr. Co., G. W. Younger Co., and G. W. Goswell Co., Total amount of work, \$8,530.

Brooklyn, N. Y.—For improvement of Queens highways as follows: Eight contracts for grading, curbing and repaving with asphaltic, concrete, Warrenite or Amiesite pavement or macadam foundation. Following are sections to be thus paved and name of contractor: Cooper ave., to Uvalde Contracting Co., \$4,600; Woodhaven ave., to Barber Asphalt Paving Co., \$6,216; Hempstead and Jamaica Turnpike, to Barber Asphalt Paving Co., \$9,851.50; Shell Road, Corona, Atkinson Constr. Co., \$30,728; Uvalde Contracting Co., Hempstead and Jamaica Turnpike, at \$43,087; Central ave., Rosedale, to Continental Public Works Co., \$28,479.50. Bids of Charles A. Meyers for grading, curbing, recubing and repaving with granite blocks on concrete foundation Metropolitan ave., Ridgewood, for \$34,791.50, and of Henry J. Mullen for same pavement for Jackson ave., Corona, for \$31,473, are also included in list.

SEWERAGE

Lyndon, Kan.—J. W. Mavity is preparing preliminary plans and estimate for sewers and water supply for city. Election will be called shortly to vote bonds.

Laurel, Md.—City Council has ordered election held March 12 for voting on bond issue for installation of complete sewerage system.

Rockville, Md.—Plans for improved sewer system for Kensington have been discussed.

Detroit, Mich.—Extension of sewer system is being discussed.

Hastings, Mich.—Orders have been issued for construction of Little Thornapple drain; estimated cost, \$40,000.

Omaha, Neb.—Bond issue of \$538,000 has been authorized; \$100,000 of this is for sewer improvements.

Oswego, N. Y.—Sewer Commission, it is said, will recommend construction of system that will cost approximately \$150,000, which is nearly \$40,000 less than that which Hatton and Snyder plans called for.

Erie, Pa.—Mayor Stern has approved of several resolutions and ordinances for construction of sewers.

Norfolk, Va.—City Engineer Brooks has adopted scheme for Ninth Ward Committee providing for expenditure of \$100,000 on trunk line sewers and sewer stations.

Norfolk, Va.—Expenditure of \$100,466 for street improvements including water and sewer pipes is planned by City Engineer for Ninth Ward Committee; also \$32,257 for storm water drains.

Warwood, W. Va.—Civil Engineer H. J. Watson, of Wheeling, has submitted report showing that it will cost \$11,880.70 for new sewerage system for Greater Warwood, \$6,500 for north end, \$221.50 for south end, and \$5,000 for Center Warwood.

CONTRACT AWARDED

Tipton, Ia.—By City, for sanitary sewer system, as follows: For city sewers, to J. W. Smith & Son, Oklahoma City, Okla., at \$1.90 for 15-in. vitrified pipe laid; \$1.78 for 12-in.; \$1.06 for 10-in.; 63 cents for 8-in.; \$2 for 12-in. cast

iron pipe laid; \$1.50 for 10-in.; \$1.50 for 8-in.; \$36 for manholes; \$59 for flush tanks; total, \$53,979. For outlet and septic tank, to M. Tschirgi & Sons, Dubuque, Ia., at 60 cents for 15-in. vitrified pipe laid; \$25 for manholes; \$9 for concrete bulkhead; total for outlet, \$563; \$9.50 for 258 yds. finished concrete; 4 cents per lb. for 10,000 lbs. reinforcing bars; 2 $\frac{1}{2}$ cents lb. for 2,700 lbs. manhole covers; 50 cents for iron steps; 2 $\frac{1}{2}$ cents per lb. for 1,520 lbs. cast iron outlet covers; 2 cents per lb. for cast iron pipe; 50 cents for wrought iron pipe, 8-in.; \$20 for gate, 8-in. valves; \$27.50 for gate, 10-in. valves; 10 cents per lb. for angle iron weirs and bolts; 10 cents for 254 sluice gates; 15 cents for filling; 10 cents for seeding; \$125 for alternating siphons, 10-in.; total for septic tank, \$3,520.86. For filter beds, to Grant Baker, Tipton, Ia., as follows: Thirty cents per cu. yd. for 1,110 yds. sand in place; \$1.65 per cu. yd. for 175 yds. gravel in place; 48 cents for 120 ft. 12-in. vitrified pipe laid; 32 cents for 6-in. vitrified pipe laid; 72 cents for 6-in. vitrified tees laid; 3 $\frac{1}{2}$ cents for 6-in. drain tile laid; 16 cents for 12-in.; 72 cents for 12-in. and 6-in. tile Y's laid; 20 cents for inlets and dist. troughs; 50 cents for 15-in. vitrified pipe laid, tank outlet; \$5 for 12-in. lamphole 5 ft. deep; total cost of filter bed, \$2,822.26. Other bidders as follows: (a) city sewers, (b) outlet, (c) septic tank, (d) filter beds. C. B. McNamara, Dubuque, Ia. (a) \$59,858, (b) \$685.25, (c) \$3,946.86, (d) \$3,387.70. F. C. Robinson, Manitowoc, Wis. (a) \$64,669.20, Garberick & Anderson, Sheldon, Ia. (a) \$75,457.40, Lana Construction Co., Harlan, Ia. (a) \$82,581. Hoar & Parkinson, Iowa City, Ia. (b) \$795.50, (c) \$3,739.06, (d) \$3,807.20. Cook Construction Co., Des Moines, Ia. (b) \$805.50, (c) \$3,861.67, (d) 3,860.70. Geo. B. Imman, Kansas City, Mo. (b) \$853, (c) \$3,314.99, (d) \$3,834. W. D. Geager, Cedar Rapids, Ia. (b) \$858.25, (c) \$3,864.07, (d) \$4,153. Iowa Engineering Co., Clinton, Ia., Engineers.

WATER SUPPLY

San Diego, Cal.—People will be asked to vote bonds for \$2,500,000 for purchase of Southern California water system, owned by John D. Spreckels. Total cost, \$4,000,000.

Cartersville, Ga.—Commissioners are planning to submit bond issue for purpose of enlarging and extending waterworks system.

Macon, Ga.—City will extend her waterworks system distance of over 23 miles, total cost of which will be nearly \$125,000.

Lyndon, Kan.—J. W. Mavity is preparing preliminary plans and estimates for water supply and sewers. Election will be called in near future to vote bonds.

Grand Haven, Mich.—By vote of 627 for to 46 against, electors of Grand Haven at special election decided to issue \$60,000 in bonds for purpose of extending and improving waterworks system.

Saginaw, Mich.—Bids are being considered for two auxiliary pumps of 4,000,000-gal. capacity every 24 hours for east side plant.

Youngstown, O.—City Engineer Lillie has been authorized to employ consulting engineer of national reputation to assist with plans for construction of Milton Dam.

Talent, Ore.—Final plans and specifications will be out within a few days for municipal water system to consist of deep well pumping plant, 100,000-gal. stand pipe, 2,000 ft. of 8-in. wood pipe main, and about 9,000 ft. of cast iron pipe distribution. Estimated cost, \$20,000. Bids are being received. F. E. Hobson, Grants Pass, Ore., Consulting Engineer.

Johnson City, Tenn.—Bonds in sum of \$375,000 for water plant will shortly be sold.

CONTRACT AWARDED

Dayton, O.—By Board of Control, for furnishing 630 tons of cast iron pipe for local waterworks, to J. B. Clow's Sons & Co., of Chicago, at \$16,000.

LIGHTING AND POWER

Lincoln, Cal.—Installation of municipal electric lighting system is being considered.

Roseville, Cal.—Installation of municipal lighting system is being considered.

Swainsboro, Ga.—Town has voted in favor of bond issue for electric lighting.

Evansville, Ind.—Electric lights have been ordered installed in various streets by Board of Public Works.



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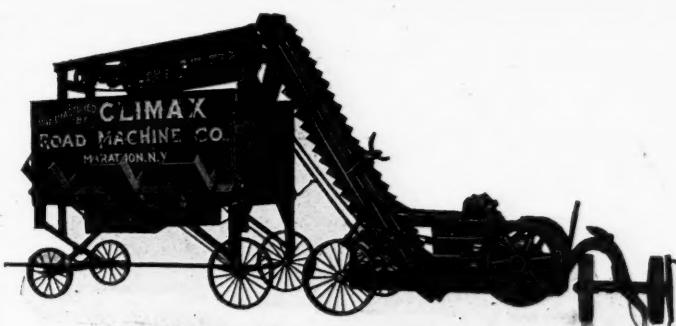
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Fort Scott, Kan.—Franchise has been granted Citizens Mutual Electric Co., for 30 years, for furnishing of light and power.

Cedar Springs, Mich.—At special election this village has unanimously voted to grant franchise to Grand Rapids-Muskegon Power Co. to furnish village with electric lights and power.

Camden, N. J.—Plans for city owned lighting plant have been ordered drawn by special committee of Council.

Montclair, N. J.—Ordinance granting Public Service 20-year electric lighting franchise has passed first reading.

Buffalo, N. Y.—Petition has been made to Board of Aldermen for better lighting of Sycamore st., between Fillmore ave. and Erie tracks.

Weedsport, N. Y.—At special meeting of Village Board of Trustees question of municipal ownership of electric lighting plant was thoroughly discussed by members of Board.

Kinston, N. C.—Buchman Co., of Philadelphia, will shortly ask for gas franchise of Board of Aldermen.

Wapakoneta, O.—New Knoxville town in western part of county will erect electric lighting plant.

Portland, Ore.—Petitions for scores of arc lights have been granted by City Executive Board. Committee will advertise for bids to illuminate unlighted districts.

FIRE EQUIPMENT

Florence, Ala.—Purchase of fire automobile is being discussed.

Grass Valley, Cal.—Purchase of modern auto fire truck has been authorized.

Grand Rapids, Mich.—For purchase of front drive motor device for No. 1 truck, to C. J. Cross Co., of New York, for construction and installation which will cost city \$3,950.

Chisholm, Minn.—Village Council has opened bids for supplying hook and ladder truck for Fire Department. Several bids were received, but matter was referred to Purchasing Committee with power for them to act.

St. Joseph, Mo.—Fire houses to be constructed out of \$52,100 are those at 33d and Mitchell, 4th and Charles, 4th and Faraon, and 4th and Sycamore, and plans include remodeling of Central station, 7th and Charles sts.

Blair, Neb.—Blair Volunteer Fire Department will shortly erect city hall and fire house combined; estimated cost, \$12,000.

CONTRACT AWARDED

Peoria, Ill.—To Robinson Fire Apparatus Mfg. Co., of St. Louis, Mo., for furnishing one auto fire engine and one combination auto chemical and hose wagon, at \$14,375.

BRIDGES

Pasadena, Cal.—City Clerk has been instructed to advertise notice calling for bids for construction of reinforced concrete bridge across Arroyo Seco at Colorado st.

Pomona, Cal.—Construction of viaduct across railroad tracks to connect business section of Pomona with north side residence section is being discussed.

Jacksonville, Fla.—Construction of reinforced concrete bridge over Cracker Swamp is being discussed.

Chester, Pa.—Erection of bridge over Chester River at 5th st. is being discussed.

Woonsocket, R. I.—Joint standing committee on highways of City Council has unanimously voted to recommend adop-

tion of resolution providing for appropriation of \$36,000 for building of new bridge over Blackstone on Bernon st.

CONTRACT AWARDED

Broken Bow, Neb.—By County Board of Supervisors, for construction of bridges in 1912, to Omaha Structural Steel Works.

PROPOSALS

NOTICE TO BIDDERS

or Furnishing Boiler, Engine, Generator and Appurtenances.

Afton, Okla.

Sealed proposals will be received by the Board of Trustees at their office in the City Hall at Afton, Oklahoma, until 12 o'clock noon, March 4th, 1912, for furnishing, delivering and erecting on foundation furnished by the city, complete and ready for service, the following, to wit:

One—Combined high speed Engine and Electric Generator, 60-cycle, 3-phase, having capacity of 100 k.w.

One—Return Tubular Boiler supported on Gallops frame, with brick setting, steam pressure 125 lbs., capacity 180 h.p.

One—A. C. Motor Driven Centrifugal, single stage pump, 300 G.P.M., against 150 ft. static head.

One—One marble switchboard mounted in angle iron frame, with complete complement of fixtures as per specifications.

One—Steel or Iron Smokestack and Breeching (for two boilers) 40in. in diameter by 70 ft. high, supported on sub-base or I beams above boiler.

All of the above machinery to be installed in accordance with the above notice and the general plans and specifications on file with the Board of Trustees in Afton, Oklahoma and at the office of the Consulting Engineers, Goodwin & Harper, 920 Scarritt Bldg., Kansas City, Missouri, copies of which will be furnished on application to the Engineers.

the economical performance of engine and generator, the approximate weights of each, the guaranteed time of delivery and completion ready for operation.

No proposal will be considered unless accompanied by a certified check or its equivalent on a solvent bank or trust company, authorized to do business in the State of Oklahoma, in the sum of Six Hundred (\$600.) dollars as a guarantee that should the contract be awarded to such parties, they will within ten (10) days, enter into a contract and furnish security satisfactory to the Board of Trustees for the furnishing, delivering and erecting of all the machinery and appurtenances named in such proposal.

The Board of Trustees do not bind themselves to accept the lowest bid if it seems to be to the interest of the city to do otherwise.

They further reserve the right to accept or reject any bid offered, if it appears to be to the city's interest to do so.

Approved by

(Signed.)

I. T. HESS,
President Board of Trustees
Afton, Oklahoma.

Attest:

(Signed.)

W. E. SMITH,

City Clerk.
2-22-1912.

CONTRACTORS

SUBWAY BIDS OPENED

MARCH 22, 1912

for the construction of Section 2-A of the Lexington Avenue Rapid Transit Railroad of New York City.

530 feet of four-track subway, between Walker street and a point 50 feet north of the center line of Howard street, embracing the Canai street station and the underlying portion of the Canal street subway.

Write or call concerning forms of contracts, plans and specifications.

PUBLIC SERVICE COMMISSION FOR THE FIRST DISTRICT,

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Twenty horse-drawn street watering carts, mostly steel tanks, and all in good condition.

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